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STADIUM RACER p. 39

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READERS' CHOICE
AWARDS

TECHNOLOGY
THAT WILL
CHANGE RC!

p. 142

7 RACE MISTAKES
YOU'RE MAKING RIGHT NOW p. 182



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» TAMIYA RACE-TOUAREG » GS RACING AVENGER MK2
» DURATRAX STREET FORCE GP2 » THUNDER TIGER EB-4 S3
» CARISMA F1 » NOVAK HV-MAXX BRUSHLESS SYSTEM

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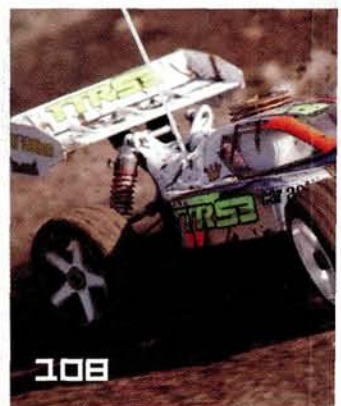
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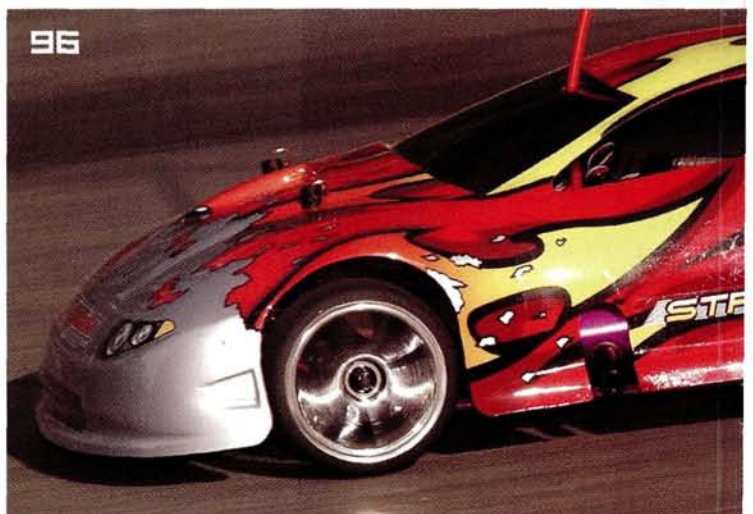
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Rock the Vote!

The annual *RC Car Action* Readers' Choice Awards are upon us, and you'll find the ballot in this very issue (page 242, as a matter of fact). It's always fun to play the "what's my favorite RC stuff?" game, but there's more to the Readers' Choice Awards than that. First and foremost, this is your chance to tell the RC industry what you're into. For example, you can bet that if a mini truck wins the "Electric Truck" category, the industry will take notice, and we'll see even more of the mini monsters. The Readers' Choice Awards is also your chance to win something! We'll select one ballot at random as our winner. If it's yours, you can pick any one of the winning vehicles as your personal prize! Voting is easy; you can fill out the ballot in this issue and snail-mail it to us, or just click over to rccaraction.com and get it done online. No matter how you vote, only one ballot will be accepted per reader (insert Ohio re-count joke here). Here are some things to think about as you make your picks:

- » **There are no restrictions on which products you can vote for or why.** You might vote for something because you tried it and liked it, or because it's exotic and expensive and you just gotta have it, or for any other reason—it's your call.
- » **Don't guess.** For example, if you're not up on the latest engines and prefer to leave that category blank, you can.
- » **The "On-Road/Touring" categories are open to anything that isn't an off-road car.** You don't have to vote for a touring car! If your favorite road car is 1/12 scale, 1/8 scale, a mini ... you can vote for 'em in the "On-Road/Touring" categories.
- » **Be precise.** Please fill out the manufacturers' names and model information completely. Readers' Choice is about your favorite products, not just your favorite brands!

In This Issue

HEAD TO HEAD: ASSOCIATED T4 RTR VS. TEAM LOSI TRIPLE-X^T SPORT II

The twin titans of electric off-road racing go at it again, this time with the ready-to-run versions of their popular race trucks. Team Losi came out on top when we pitted the full-race kit trucks against each other in the October 2004 issue, so this should be interesting!

FUTURE TECH!

The Spektrum DSM system will revolutionize RC. Seriously, that's not hype. No interference, no "channels," no runaways—see for yourself on page 142.

PROS KNOW!

Want to build your Associated B4 or T4 like a factory driver? We'll show you how, with help from the Team's top techs Kurt Wenger and Brent Thielke.

Don't forget to vote,



Peter Vieira
Executive Editor



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Quick show of hands: who wants to fly to Anaheim, CA, for the 2005 RCX show on *RC Car Action*'s tab? Let's see; one, two, three ... OK, it looks like you all wanna go. Hmmm, how do we narrow this down? I've got it: we'll have a sweepstakes! In addition to a cushy plane ride and two nights in Cali, the grand-prize winner gets three hot RTRs: a Team Associated TC4, a CEN Aqua Jet and a Multiplex Space Scooter! Go to page 212 or click over to rcx.com/sweeps for all the details. You can enter online, too!

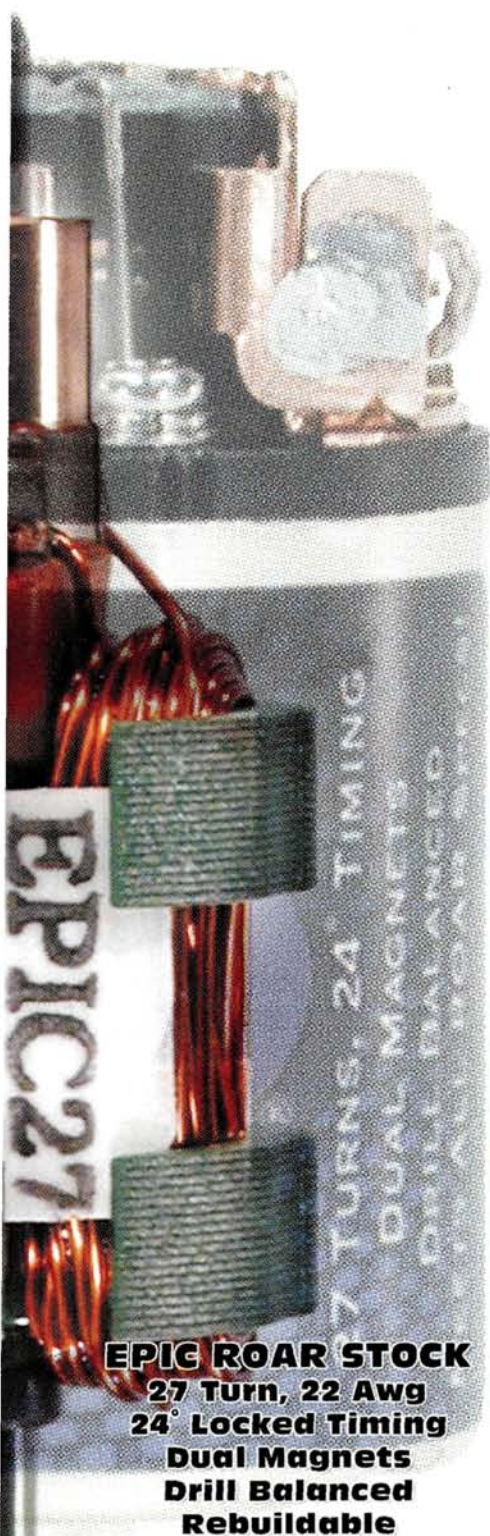


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[READERSWRITE]

Factory Fan

Sigh...why won't Associated tell us when the TC4 will be available as a "Factory Team" kit, or better yet, why don't they just offer standard and FT versions right from the start? Every time AE releases a new kit, they play this game.

Dale White

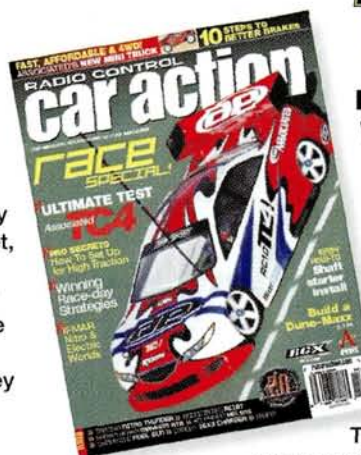
Associated wouldn't do this if it wasn't good for business, but they also want to build the best possible cars. Certainly, Associated could put all the available Factory Team upgrade parts into a box tomorrow and call it the TC4 Factory Team. But then Associated would miss the chance to revise shock locations, develop better materials, or make similar types of changes based on team driver experience that go above and beyond merely adding titanium turnbuckles and graphite parts.

—Pete

Backyard bashed

The manufacturers are coming out only with things that are race ready, and backyard bashers are often forgotten. All the companies have lost sight of the fact that backyard bashing is just plain fun. I have an electric Stampede and love it because it is very durable and fun to drive. You have overlooked backyard bashers, too. In the article "Fast \$400" in the January issue, you feature only high-performance cars and trucks that for the most part cost more than \$400. Why didn't you put in cars such as the 4-Tec and Stampede, etc? If you had used those, you could have had really good batteries and chargers and done upgrades like full bearings, motor and speed control without going over \$400. Please give the backyard bashers their share of stuff in the mag, too.

Scott



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Pudge pal

Wow! I came into the RC scene about two RCCA issues ahead of Pudge and have been witness to his awesome driving since then. This guy is what, 16, 17? He has already won the Worlds once, and I don't think he's done yet. Then in the recent issue of RCCA, he won Factory Mod and Factory Gas in the Reedy

Truck Race Of Champions—two

very competitive classes at a very competitive race. Then you say in race coverage that he "pulled away for a comfortable lead over Drake." Adam Drake!! The Drake!! What, is Drake getting old or something? And then in Open Mod, an 11-year-old, Steven Hartson, came in second. Is he next? Well, I hope all you young racers out there see that with enough practice and some determination, you can accomplish a whole lot. Oh yeah; last issue's "Backlot" was awesome.

Joe

Yes; Ryan is indeed the man, or the boy, or whatever. Drake is older, but he does have a posse. And thanks for the "Backlot" props, even though it printed funny. Tell you what: click over to rccaraction.com, and you can download the page with everything in color!

—Pete

Bugged

A couple of friends and I found a nice little track nearby, but all I had to run there was my old electric rustler (still almost all stock). So, I've been looking at cars and decided that I want a buggy. I would have gotten a touring car, but I want somthin' I can drive off road. I have narrowed it down to only a few choices—the Team Associated B4, the Team Losi Triple-X, or the Killer B. A little help choosing would be greatly appreciated. And if you could suggest a couple of hop-ups that would be nice, too. I need the extra speed to "accidentally" run over those annoying little pan cars.

Luke Woodruff

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 HEAR
 FROM
 YOU!**



Email us at readerswrite@airage.com, or put the postman to work by mailing your letter to Readers Write, 100 East Ridge, Ridgefield CT 06877-4606 USA. Please include your city and state, and let us know if we may publish your email address. We can't reply to every letter and email, but we read 'em all!

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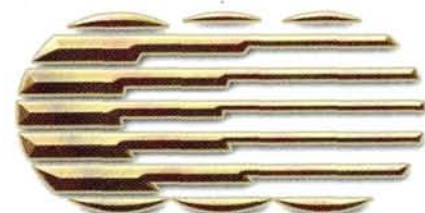
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[READERS WRITE]

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The Killer B is Trinity's body for the B4, not a complete buggy. The Losi and Associated rides are the very best, and you can even get the B4 as an RTR. If you are into RTRs, don't overlook the DuraTrax Evader; it's excellent. As for hop-ups, they can wait. All the aforementioned machines are very well equipped with full bearings, aluminum shocks, good tires and adjustable suspensions.

—Pete

We goofed

Hi; great mag! I don't want to seem picky, or anything, but I just thought I'd let you

know that on page 144 in the February 2005 issue you said that the DuraTrax Intellispeed 8T Reverse has no reverse lockout, but I'm pretty sure it does. Otherwise, great magazine! Your magazine is what got me started in RC in the first place, just 3 years ago, and now I have six cars and a TC4 on its way.

Zac
Racine, Wisconsin

We goofed, and you're right; it does have reverse lockout. I knew that!

—Pete

YOU SAID IT

"You guys do not have one word about XMODS."

I picked up last month's and this month's issue at the store, and when I looked through it, I was kind of disappointed because I have raced and worked on RadioShack XMODS since they came out! You guys do not have one word about them. I also looked in other RC magazines, and there was nothing about them there, either! They are becoming very popular, so I think that if you include a monthly column about

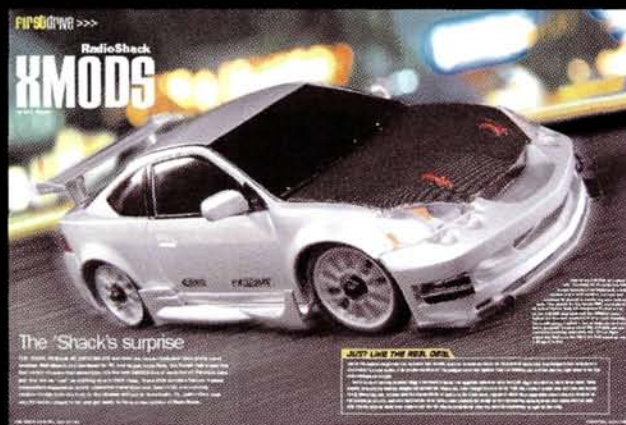
them, your magazine will sell even better! You could buy a stock XMOD and add one or two parts to it every month and explain how they will affect performance and include a test ride that shows how much better than stock the upgrade made the car.

I have the '65 Mustang, 350Z, Nissan Skyline (yellow) and Honda Civic (black) XMODS. My Mustang has two Lithium-Ion double-AA batteries and an X-1 super-speed motor (made by performancexmods.com). I took the stock FET off and replaced them with 7 AMP FET. I have an aluminum one-piece upper deck, servo strap, metal heat sink, carbon-fiber driveshaft, and I have all aluminum GPM parts on order and a carbon-fiber chassis on order! I hope you guys will include XMODS in your magazine!

Jeremy

We respect and like XMODS, and even did a feature on them when they debuted (see the February 2004 issue). XMODS are indeed popular, but sheer popularity isn't what makes an RC machine worth page space. If it were that simple, we would review all sorts of inexpensive department store RC toys that far outsell high-performance, hobby-grade RC cars and trucks. Readers, you tell us: if you want more XMODS stuff, we'll give it to you.

—Pete



Every month, "Readers Write" sponsor Team Trinity awards the "You said it" letter writer the Reference body of his choice. This is the Trinity C Machine.

EXXCLUSIVE!

All-new Traxxas Jato 2wd nitro stadium truck

The specs aren't final on this all-new 2WD machine, but here's what we know for sure: It's trick! Just as the Revo completely turned monster-truck convention upside-down, the all-new Traxxas Jato looks ready to send shock waves through the 2WD stadium truck scene. Obvious features include buggy-style mudguards, TRX 2.5 power and Revo aluminum shocks, but there's a lot more going on—here's what we know so far:

CHASSIS

- » Super-low CG with center-mounted engine
- » Blue-anodized 3mm 6061 T6 aluminum chassis plate
- » Fully countersunk
- » Hex hardware throughout
- » Receiver pack can be mounted on the chassis (between the engine and fuel tank) or in the rear compartment.

DRIVETRAIN

- » Internal, adjustable 2-speed
- » Revo-style silicone-filled gear differential
- » Revo-style heavy-duty slipper clutch
- » Universal-joint axles with dust boots



SUSPENSION

- » Captured, hardened-steel hingepins—no E-clips
- » Captured "double shear" rod ends
- » Optional swaybars
- » Angled steering bellcranks for zero bump-steer
- » Fully adjustable, including roll centers, anti-squat and rear toe.
- » 30-degree caster blocks with 25-degree option

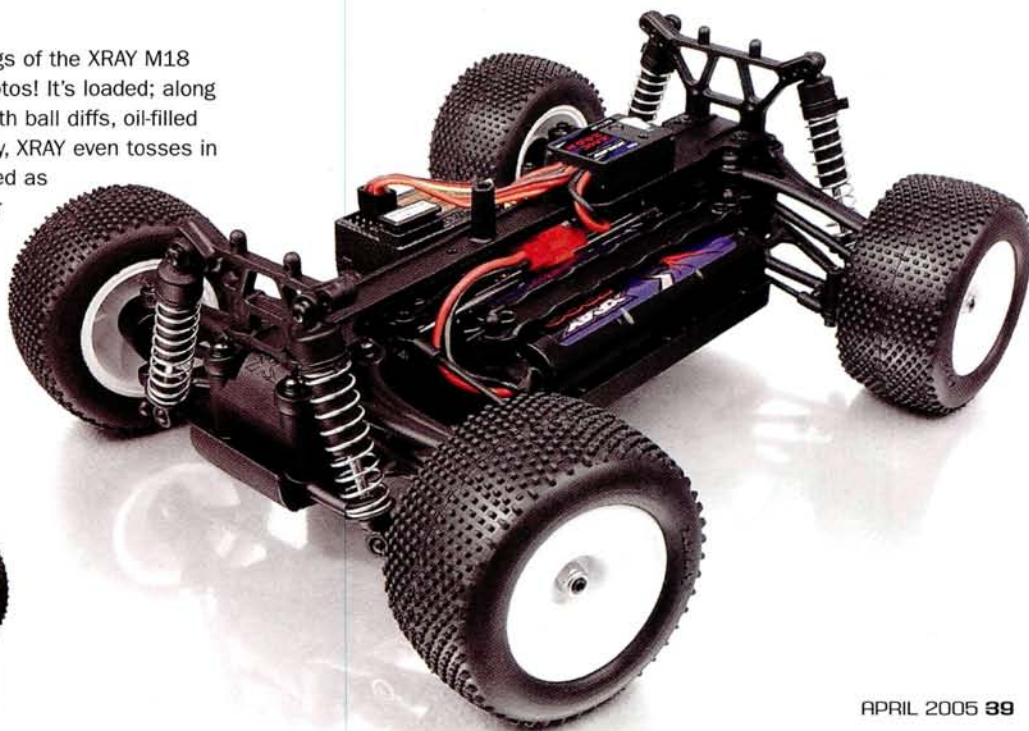
By the time you read this, many more details will have been worked out. Visit rccaraction.com for the most up-to-date news and delivery info!

Traxxas Corp. (972) 265-8000; traxxas.com.

XRAY M18

We were the first to bring you CAD drawings of the XRAY M18 mini-truck, and now we've got the first photos! It's loaded; along with 16 ball bearings, shaft-driven 4WD with ball diffs, oil-filled shocks, pin-spike tires and a stadium body, XRAY even tosses in a Hudy screwdriver! The M18 will be offered as an unassembled kit without electronics, or with XRAY's Pro Power Pack, which adds a microservo, 6-cell battery pack, micro reversing speed control and 300-size motor to the mix.

XRAY Products distributed by RC America (800) 519-RCA1; teamxray.net.

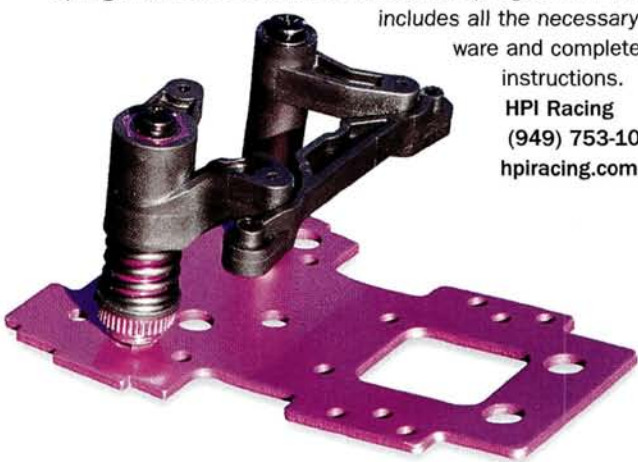


HPI Racing savage cam-type servo-saver/throttle-return spring set

HPI offers this new steering-system upgrade for its Savage line of trucks. The new cam-type servo-saver delivers quicker and more accurate steering response and offers full adjustability of the servo-saver for extra steering-servo protection. According to HPI, you will immediately notice how precise the steering feels, and you will get more steering at high and low speeds (it also centers better). The set also includes a stronger throttle return spring and a revised throttle servo-saver spring as well. The set

includes all the necessary hardware and complete instructions.

HPI Racing
(949) 753-1099;
hpiracing.com.



Plugz Hitch covers for 2-inch receivers

For full-size trucks with standard 2-inch hitches, Plugz makes these cool hitch covers to dress up that ugly empty receiver hitch. Three versions are available: a paddle tire for sand fans, the V-tread Masher tire for off-roaders and the 40 Series Road Rage tire with spinner attachment. All the tires come mounted on fully licensed Weld Racing Outback chrome wheels.

Plugz; distributed by Pro-Line Racing
(909) 849-9781; pro-lineracing.com.



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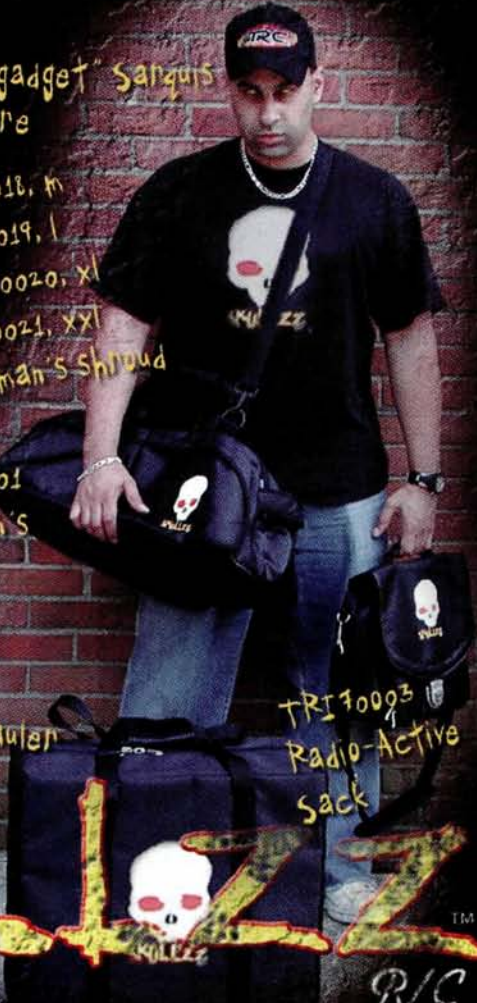
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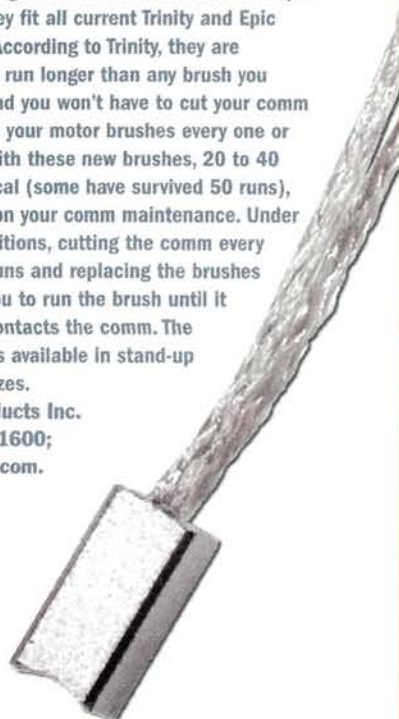
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Trinity XXX Cobalt Lemans High silver motor brush

The guys at Team Trinity have been raving about these new high-silver-content Cobalt P-94 style brushes. They fit all current Trinity and Epic modifieds. According to Trinity, they are designed to run longer than any brush you have run, and you won't have to cut your comm and replace your motor brushes every one or two runs. With these new brushes, 20 to 40 runs is typical (some have survived 50 runs), depending on your comm maintenance. Under racing conditions, cutting the comm every five to six runs and replacing the brushes will allow you to run the brush until it no longer contacts the comm. The XXX brush is available in stand-up and P-94 sizes.

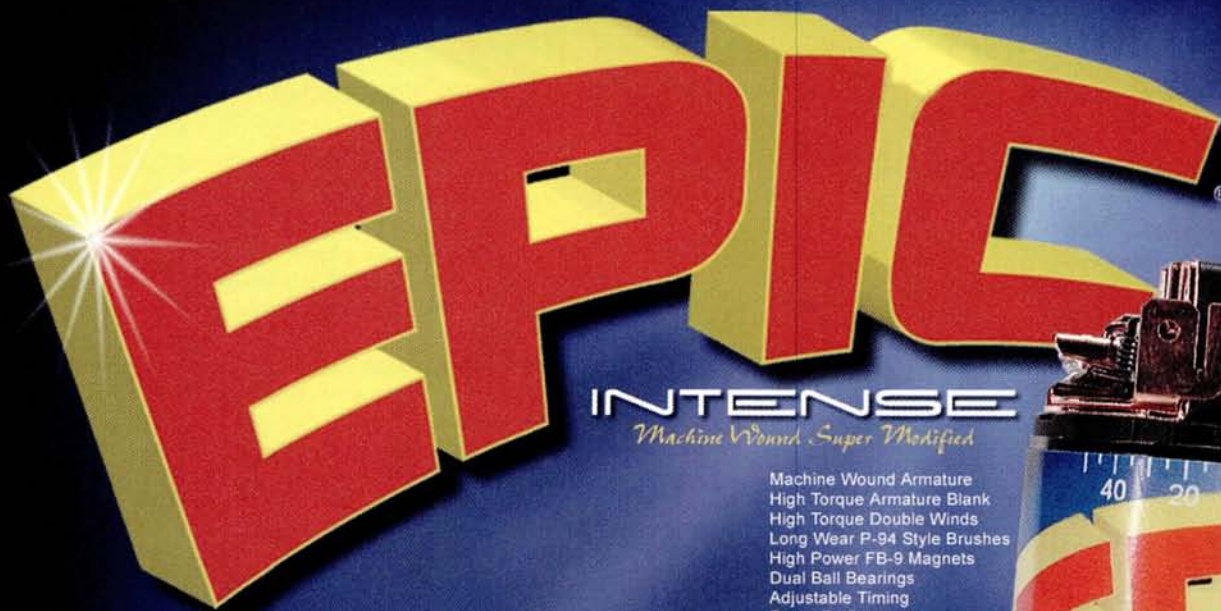
Trinity Products Inc.
(732) 635-1600;
teamtrinity.com.



Pro-Line Racing Super Duty F-650

Today's massive monster trucks deserve equally big bodies. Pro-Line Racing now offers a replica of the biggest Super Duty F-Series Ford truck ever built: the semi-truck-inspired F-650. The body comes detailed with a bull-nose front end, a full four-door cab, a long bed and aggressive styling. Designed to fit the MGT, LST, TNX and Genesis, the body is made of tough, durable .060-inch-thick Lexan and comes with plenty of decals and window masks.

Pro-Line Racing (909) 849-9781; pro-lineracing.com.



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- EP1122, 19 Turn Single, Excellent For 19 Turn Spec Racing, Trucks, Long Run Times

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Yokomo Drift Package D1-Spec with Blitz ER34 skyline body set

Yokomo has been at the forefront of RC drifting, and it has a new D1-Spec drifter with a detailed replica body of the Blitz ER34 Skyline. Yokomo's drift cars are super-detailed; they come with aero mirrors, windshield wipers, wings, exhaust pipes, working lights and more. Under the body, you'll find Yokomo's CM version of its race-proven MR-4TC SD shaft-driven 4WD chassis. What makes the kit unique are its included hard-compound "Super Drift" tires with special drift rings (for producing that crazy sideways action).

Yokomo USA Inc. (949) 252-8663; yokomousa.com.



Protoform Dodge Stratus 3.0

The Dodge Stratus is the most popular body in touring car racing. For the past six years, racers around the globe have chosen Stratus bodies to win national titles and world championships. Protoform's latest version, the Dodge Stratus 3.0, is designed for a variety of track conditions—from high-bite asphalt to carpet courses. It conforms to current IFMAR and ROAR specs and comes with an add-on wing, mounting hardware, a decal sheet and window masks. It comes with two trim lines: one is for the sanctioned

115mm height, and the other is for slammed-style club racing on smaller-diameter foam tires. According to Protoform, it's light, too, thanks to the use of durable 0.030-inch Lexan (it weighs 90 grams without film or paint). Protoform Inc.; distributed by Pro-Line (909) 849-9781; pro-lineracing.com.

Trinity Itsy Bitsy Racer Graphite conversion

Trinity now offers this sweet-looking graphite package for its diminutive mini-truck. The Racer Graphite kit consists of a chassis, an upper plate, a battery hold-down, light anodized-aluminum front and rear chassis braces, an aluminum center-shaft bearing support, aluminum motor mount, long-wheelbase body and all the hardware necessary to complete the conversion. Also seen here on the truck are Trinity's new aluminum-body, fluid-filled shocks (sold separately).

Trinity Products Inc. (732) 635-1600; teamtrinity.com.

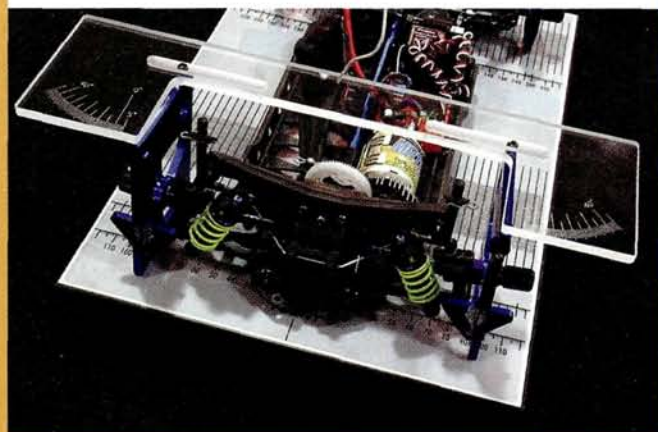


>>>PIT BOX

Integy setup station 2

Integy's new Setup Station 2 allows you to dial in your car's camber, toe and caster quickly and easily. It comes with a medium-size setup board (an optional large board is also available), and each measuring tool is ball-bearing supported for greater accuracy. In addition, it comes with a factory-installed, plastic, nonslip surface sticker, has a built-in bubble level and three-point supports. Just how accurate is it? Integy claims it can detect less than 0.2 degree of camber change.

Team Integy (909) 444-2766; integy.com.





POWER ZONE

Team checkpoint competition modified motors

We've seen glimpses of the new Team Checkpoint mods, but these are the first official shots. This new hand-wound modified motor features a design based on ROAR specifications. Its noteworthy features include a precision-machined aluminum endbell, long-wear round brushes and oversize soldering tabs for easy speedo installation. The aluminum endbell keeps the brushes cool even under heavy loads, and the coiled brush springs ensure consistent tension that maintains a solid contact between the brush and the commutator. According to Checkpoint, its comms last for more than 50 runs before needing to be cut.

Team Checkpoint; distributed by O'Donnell Racing (562) 944-9671.

Hudy starburst buggy wheels

Hudy's new 41mm 1/8-scale buggy wheels have a split 6-spoke design that prevents the insides of the wheels from being clogged with dirt and becoming unbalanced. They're made of a tough plastic blend and are the stock wheels for the

XRAY XB8. Bonus: the Starbursts also look way more stylish than dish wheels. Hudy Special Products; distributed by RC America (214) 744-2400; hudy.net.



>>> REVO ROUNDUP

Sirio .23 engine mount and manifold for Revo

Want to slap Sirio's baddest big-block into your Traxxas Revo? Well, now you can, thanks to this engine mount/exhaust manifold combo. It replaces the center section of the stock two-piece engine mount so that you can bolt in the wider .23 engine. The exhaust header adapts the Sirio .23's big-block exhaust port to the stock tuned pipe. The exhaust manifold also fits standard big-block engines, and it will be available separately for those who want a larger-diameter high-performance manifold for use with the Traxxas and other big-block conversion kits.

Sirio; distributed by Trinity Products Inc. (732) 635-1600; teamtrinity.com.



Trinity High-Flow super pipe for Traxxas Revo

It's designed for maximum power and grunt, and Trinity claims that its new Revo pipe makes more power than the stock Traxxas exhaust system. The pipe has a removable stinger insert so that with a change of manifold, it can be used with a Sirio .18, a .23 and most other big-blocks. The pipe comes with manifolds for the Traxxas 2.5 and Sirio engines.

Trinity Products Inc. (732) 635-1600; teamtrinity.com.



Golden Horizons Aluminum Revo hop-ups

Golden Horizons offers a whole host of new aluminum hop-ups for Traxxas' new Revo.



Included in the first batch are these trick-looking cantilevers (both 90T and 120T versions), adjustable body mounts and steering blocks. All the parts are CNC machined out of billet aluminum and come anodized in blue and silver finishes.

Golden Horizons Enterprises Co. (604) 331-2526; ghobby.com.

Hardcore Racing components Titanium Revo parts

There's no doubt that Hardcore Racing makes some of the cleanest titanium upgrades out there, and it now offers an insane number of ti goodies for the Traxxas Revo. The lust—I mean, list—of upgrades includes an undercarriage skidplate, a gas-tank skid, a rollbar/handle, cantilevers, a battery cover, a cylinder head and front and rear bumpers. All the parts are available in natural, green, purple and blue finishes.

Hardcore Racing Components (661) 294-5032; racinghardcore.com.



HOT RUBBER

Team Losi pink-compound King-Pin truck tires

Team Losi's King-Pin tires are now available in its exclusive pink rubber compound. The King-Pin has become very popular with electric and nitro truck racers. According to Losi, the new compound, coupled with the tread design provide racers with tires that excel on most indoor surfaces.

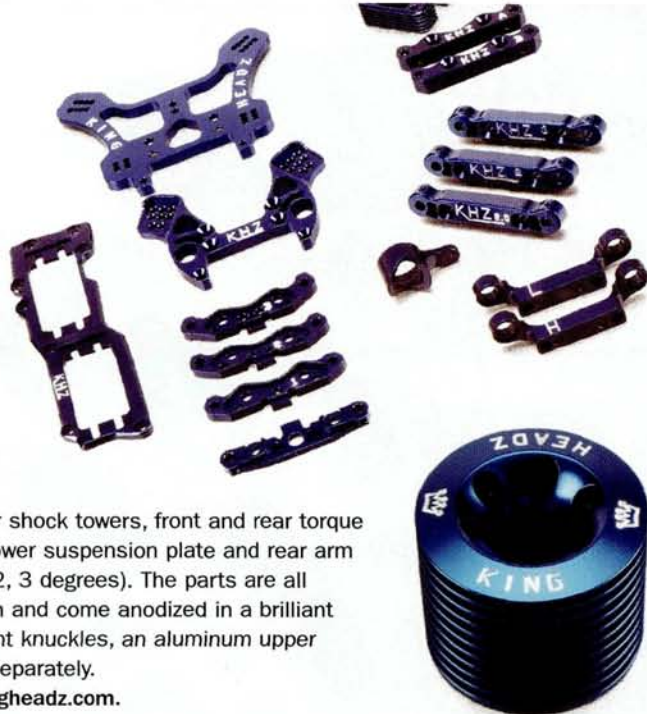
Team Losi; distributed by Horizon Hobby Inc. (800) 338-4639; teamlosi.com; horizonhobby.com.



king headz 777 hop-up kit

King Headz now offers this upgrade kit for the MP777—Kyosho's new, 1/8-scale buggy (the parts are also available separately). The kit includes front upper/lower suspension holders, a steering upper plate, an engine-mount set, rear toe-in set, radio plate, front and rear shock towers, front and rear torque arms (chassis braces), a front lower suspension plate and rear arm mounts to adjust anti-squat (1, 2, 3 degrees). The parts are all machined out of 7075 aluminum and come anodized in a brilliant blue finish. King Headz sells front knuckles, an aluminum upper servo-saver and shock mounts separately.

King Headz (219) 405-1024; kingheadz.com.



Yokomo MR-4TC SD world's replica kit

The MR-4TC SD was specially designed by the Yokomo development team for the 2004 IFMAR ISTC World Championship. Now you can own a special, limited-production World's replica kit (only 555 kits will be available worldwide).

Specs include:

- » Machined-aluminum cases that lower transmission components by 4.5mm and the upper deck by 2mm
 - » Floating motor mount for improved cooling efficiency
 - » Shorter-span, front lower suspension arms and aluminum suspension mounts with modified pivot points for the short arms
 - » Graphite chassis (2.5mm), shock towers and rear body post mount (3mm), upper deck, battery plate and front bumper support (2mm)
 - » Aluminum universals, input shafts, rear arm mounts and ball studs
 - » Hollow graphite driveshaft
 - » Titanium hardware
 - » Front one-way
- Yokomo USA Inc. (949) 252-8663; yokomousa.com.

POWER ZONE

Axe Rossi New engines

Axe Rossi has three brand-new engines: the LSK .21, the R21 1/8-scale buggy engine and the X3 .12 1/10-scale on-road engine. Here's a rundown on their specs:



LSK .21: this 6-port, long-stroke engine features a new carb design and a piston made of a new material that extends piston/sleeve life. It comes with a black aluminum head for better cooling. According to Rossi, it puts out 2.9hp at 37,500rpm.



The R21 Speed .21 1/8-scale off-road engine also has 6 ports and offers 2.5hp at 36,000rpm.



The X3 .12 1/10-scale on-road engine has 3 ports and meets current EFRA specs. It features a new crankshaft and piston and carb design; it puts out 1.7hp at 38,000rpm.

Axe Rossi; distributed by Trinity Products Inc. (732) 635-1600; teamtrinity.com.

Megatech Afterburner

The folks at Megatech tell us that their new Afterburner drag car hits speeds of 60mph+ in less than three seconds. Now, that's fast! The car comes 100-percent assembled, so it's ready to tear up the street in no time. It comes with a Q1.6 engine installed, full radio gear and a painted body with front and rear spoilers. Other noteworthy features include: a T6 lightweight aluminum chassis; a 2-speed transmission; machined-aluminum front rims; an authentic rail front-end system with adjustable ride height; 100cc fuel tank; a sealed radio box; a custom-tuned exhaust system; and mounted and trued rear foam tires.

Megatech Intl. (201) 662-8500; megatech.com.



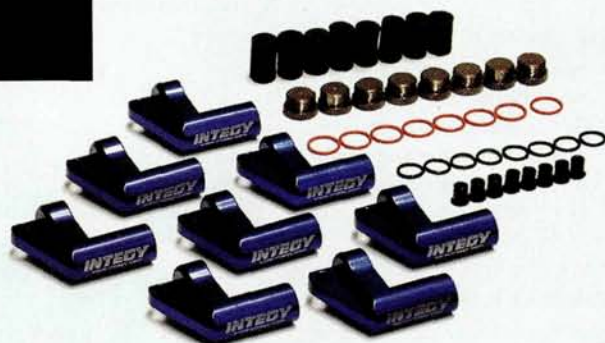
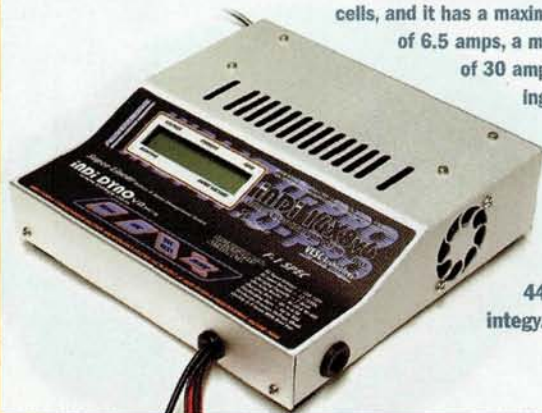
PIT BOX

Indi Electronics 16X-G40 & 16X8V6 computerized battery & motor management systems

The 16X-G40 battery and motor management system is designed for serious racers. It has a backlit display that shows each cell's information individually and can charge Ni-Cd, NiMH and Li-Ion cells. Charge rates can be set at 0.1 amp to 12 amps, and you can select delta-peak detection with 1mV to 20mV cell-selectable cutoff, or choose temperature-peak detection and use the included temp probe. You can even set the cutoff temp. The unit also discharges at up to 40 amps, and there's a motor-run feature that delivers up to 13 amps, has a motor break-in function with programmable timers and can test motor rpm and current draw. Four internal fans keep it cool. Quite an impressive unit!

The 16X8v6 is very similar to the G40 but is spec'd to be a little more affordable for club racers. The major differences are it doesn't charge Li-ion cells, and it has a maximum charge rate of 6.5 amps, a max discharge rate of 30 amps and two cooling fans instead of four.

Indi Electronics; distributed by Team Integy (909) 444-2766; integy.com.



Integy piggyback add-on for stock shocks

So what do piggyback reservoirs do exactly? Well, they reduce internal shock pressure, operating temperatures and the chances of air bubbles developing in the shock fluid (we also think they look pretty dope, too). Integy now offers these aluminum bolt-on piggyback reservoirs for the Traxxas T-Maxx and HPI Savage shocks. They are available in silver, purple and blue, are made of high-quality 6061 aircraft-grade aluminum and are a direct fit.

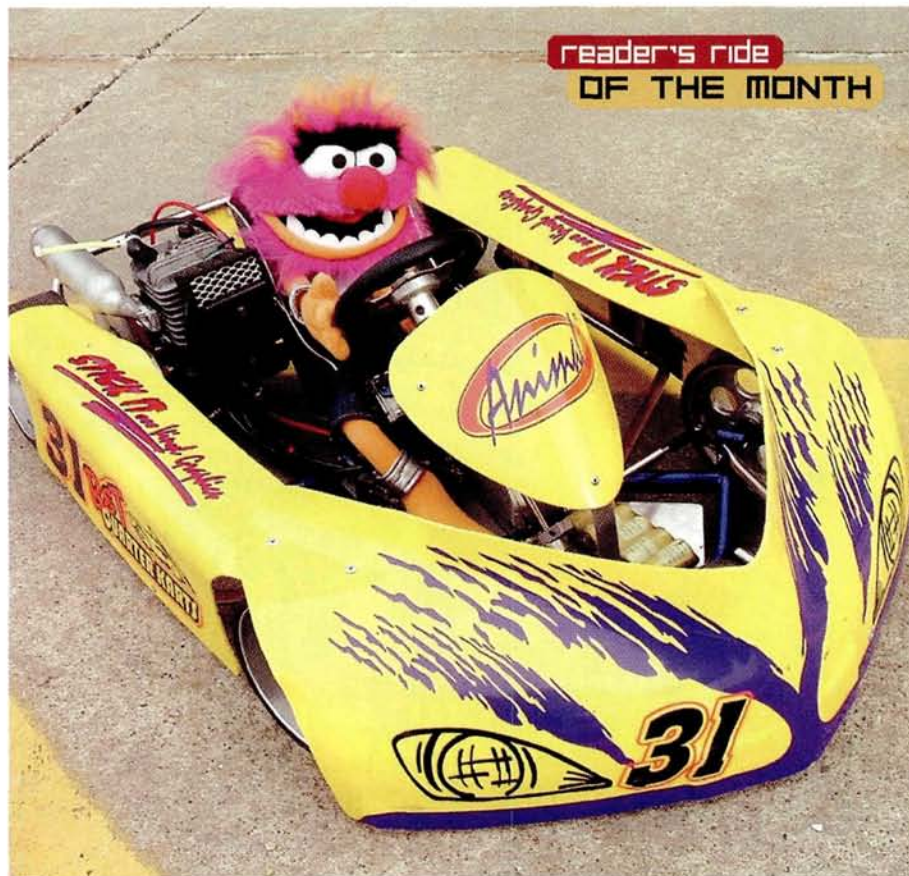
Team Integy (909) 444-2766; integy.com.



Lunsford RC18T hop-ups

Lunsford Racing has just released this trick titanium kit with titanium ball studs and turnbuckles for the popular RC18T. The kit replaces all the RC18T's ball studs, and adjustable turnbuckles replace the plastic fixed links. Titanium is lighter and stronger, so racers will want one of these "gotta have" kits. Lunsford also carries a titanium hinge pin set for the RC18T that is considerably tougher than the stock pins. Lunsford Racing (541) 928-0587; lunsfordracing.com. ■

**reader's ride
OF THE MONTH**



**Brandon Frea > Luxemburg, WI
Custom 1/4-scale shifter kart**

Brandon's homemade 1/4-scale shifter kart was ready to roll after six months of building. He ripped a 32cc engine out of a chain saw and uses it to drive the rear solid axle. A large disc brake mounted on the axle (with a dedicated servo) provides the stopping power. The bumpers and nerf bars are made of stainless-steel tubes; the main frame is made of 1/2-inch steel tube. The wheels are machined from solid aluminum and were fitted with solid rubber tires. Placing Animal from the Muppets in the driver's seat earned him extra style points with us.



**Ken Onorato > Shamong, NJ
HPI RS4 Pro 2**

A sweet-looking car and a great photograph helped to ensure that Ken's ride would be featured in "Readers' Rides" (the fact that he's my cousin didn't hurt, either). HPI's Dodge Viper body with a classic racing-stripe paint job is mounted on an old RS4 Pro 2. An LRP F1 Pro Reverse ESC, a Trinity Speed Gem modified motor and Hitec radio gear are used for the electronics.

**Herolin Simmons > Yeadon, PA
Team Associated Monster GT**

This Monster GT spends as much time in the air as it does on the ground because Herolin loves to jump his truck. He tells us that it flies very well, and that he has no problem airing it out 6 feet off the ground. He installed a Werks/Picco P3 .26 engine (and polished up the ports to squeeze out even more power) and uses an HPI aluminum tuned pipe for the exhaust. Other upgrades include an Associated Factory Team aluminum chassis and steering kit, OFNA aluminum servo arms, Integrity shocks and IMEX Swamp Dawgs tires.

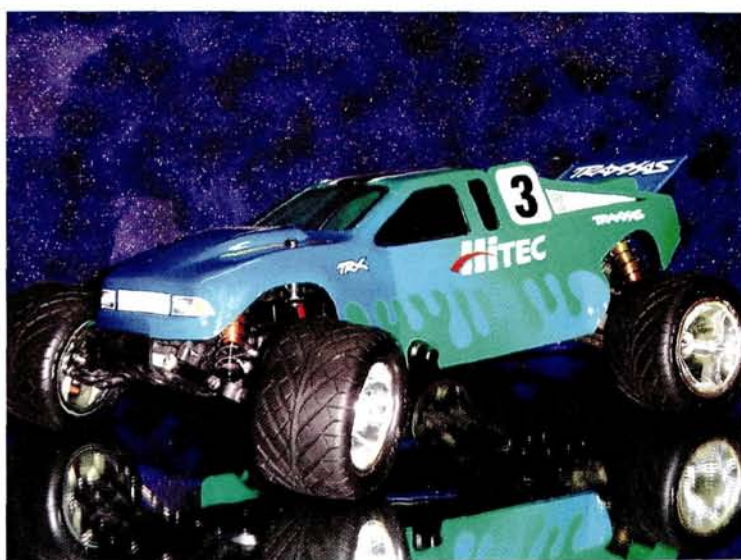


[READERS' RIDES]

Jason Haymaker > Belleview, FL

Traxxas T-Maxx

Instead of dropping the dough to get a T-Maxx, Jason did some trading to get his nitro monster truck, and it even came with a Sirio .18 engine. Now that his Maxx had a more potent mill, he added MIP CVDs, a solid rear spool, RPM suspension arms and a cold-air filter system. To make the truck look truly like his own, he installed a set of Hot Bodies Psycho tires mounted on UFO chrome rims and airbrushed a Pro-Line Jeep CJ8 body.



Cody Gorackowski > Granada, MN

Traxxas Nitro Rustler 2.5

This Nitro Rustler comes to us from one of our longtime devoted readers who finally sent us photos of his ride after years of admiring the vehicles shown on these pages. Well, Cody, you should be glad that you took the chance because here is your ride! Cody's Rustler is mostly stock except for a Hitec radio, DuraTrax aluminum shocks, Pro-Line Speed Hawg II tires and Traxxas chrome wheels.

POWER UP YOUR RTR!

#700 Reedy "Rated-X" Sport Pack, GP 3300 cells

ONLY \$64.99 Suggested Retail Price

Reedy "Spec 19 Quad-Mag Motor.

Step up the power of your RTR with Reedy's Quad-Magnet "Spec 19" Motor! A great choice for the B4 RTR, the TC3 RTR, or any Ready-to-Run electric with a speed control rated for a 19-turn or less motor.

#513 Reedy Spec 19 "Quad-Mag" Motor



Reedy's "Rated-X" Matched Sport Packs. Fully assembled in clear tubes so you can see the matching info right on the label of each cell. Don't settle for "mystery" cells in your sport packs, get Reedy's "X-Rated" packs and see the power you've been missing!



#699 Reedy "Rated-X" Sport Pack, Panasonic 3000 cells

ONLY \$59.99 Suggested Retail Price

Reedy Ni-MH Receiver Packs for Nitro Cars and Trucks.

Reedy receiver packs give you the long-lasting, reliable power needed for nitro racing, and have a great low price that makes them your BEST choice!



#615 Reedy Ni-MH Receiver Pack, (Hump style for RC10GT, Monster GT, Etc.)

#614 Reedy Ni-MH Receiver pack, (Flat style for Nitro TC3, etc.)

Brian Leestma > Westlake, OH

Traxxas Stampede

Brian discovered it's a blast to run on hard-packed snow and that his truck can stay relatively dry. He upgraded his Traxxas Stampede with an aftermarket ESC and a 17-turn, double-modified motor. He painted the Pro-Line Chevy Silverado body using a mix of metallic copper and tangerine pearl and created the cool black tribal-style graphic with XXX-Main's Predator paint mask.



Al Melville > Belvidere, IL

Yokomo MR-4TC SD SSG Special

This touring car not only looks good, but it also performs great at the track. It took Al quite some time to finish the Yokomo Nissan Silvia drift body to ensure that it would look as good as it drives. He painted the rear wing using aluminum Rust-Oleum for a realistic look, and he created the lightning bolts by scratching them into the paint using a thin mechanical pencil. He controls this ride with a JR Racing R-1 radio system and powers it with a Reedy 10-turn modified motor and an LRP Quantum Pro ESC. It rolls on Hot Works TM06 wheels. ■



SEE YOUR RIDE IN READERS' RIDES!

We want to see what you're driving! Email your 300dpi TIFF or JPEG images to readersrides@airage.com, or send color prints (no Polaroids, please) to Readers' Rides, 100 East Ridge, Ridgefield CT 06877-4606 USA. Be sure to write your name, address and phone number on the back of each photo. Submissions will not be returned; we keep them to stick on the fridge.

Mini-MAX

Reedy Hop-Ups for Micros!

ONLY
\$42.99 Suggested
Retail Price



Reedy Mini-Max High-Voltage 1100 Ni-Mh Racing Battery Pack. Higher voltage means more power and that's just what you get with Reedy's new Mini-Max 1100s. Featuring much higher voltage output than stock battery packs the Mini-Max HV 1100 pack is the ticket to making your micro car rip up the road. Comes completely factory assembled with connector and fits directly into the RC18T! #616 Reedy Mini-Max 1100 Ni-Mh Battery Pack



ONLY
\$44.99 Suggested
Retail Price

Reedy Mini-Max Modified Motor.

Seriously turn up the heat in your micro with the Reedy Mini-Max Mod Motor. Big time features like ball bearings and replaceable brushes are shrunk down to the popular 280-size to fit most 1:18 vehicles, especially the RC18T.

#290 Reedy Mini-Max Modified Motor

www.rc10.com/reedy

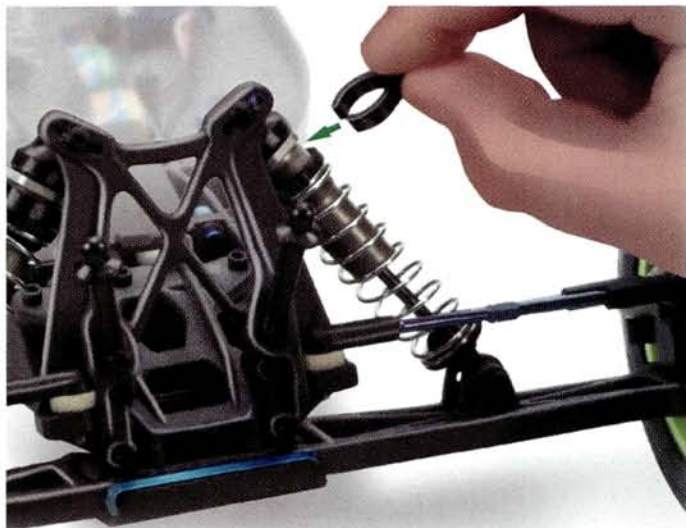
REEDY

A Division of Associated Electrics
3585 Cadillac Ave. Costa Mesa, CA 92626



More secure preload adjusters

Threaded-body shocks are very cool and easy to adjust, but the preload collars on some of those shocks have a tendency to "drift" and change the preload setting while you're driving. Install preload clips above the knurled preload adjusters to prevent the collars from moving and changing your settings.



YOUR TIP

Laminated setup sheet

Blake Jines-Storey > Westerville, OH

Blake laminates his setup sheet and then writes his setup info on it with a Dry Erase marker so he can use the sheet over and over again. When you find a setup that's a keeper, just photocopy it. Any print shop will laminate your racer sheets for a small charge.

YOUR TIP

Easy-access module tool

Colin Belisle > Fort Bragg, CA

Colin attaches a small plastic screwdriver to the antenna on his Hitec CRX radio system (as shown) with a couple of loose-fitting zip-ties. This makes it easy for him to grab the screwdriver when he wants to adjust the frequency pots on the side of the Hitec Spectra module.



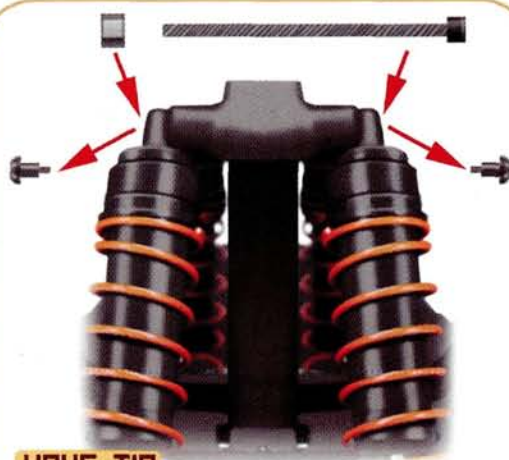
Micro RC display

Model Master, Pioneer Plastics and a few other companies sell clear-plastic display cases for 1/24- and 1/18-scale plastic and die-cast static models that work great for displaying your micro machines. The cases keep your cars dust-free until you're ready to race, and they're available at most hobby shops. Some even have accessories such as lighting kits and different backgrounds.



Better receiver seal

Dirt that accumulates inside your receiver can cause glitching. Open your receiver's case, shake out the dirt, and then close it. Seal the receiver case's seam with tape. Also cover the unused third channel or battery slot (if you run an electric car) with a clear piece of decal material or tape. This tip is also good for speed controls; you'd be surprised how much dirt can get in through the setup-button opening.

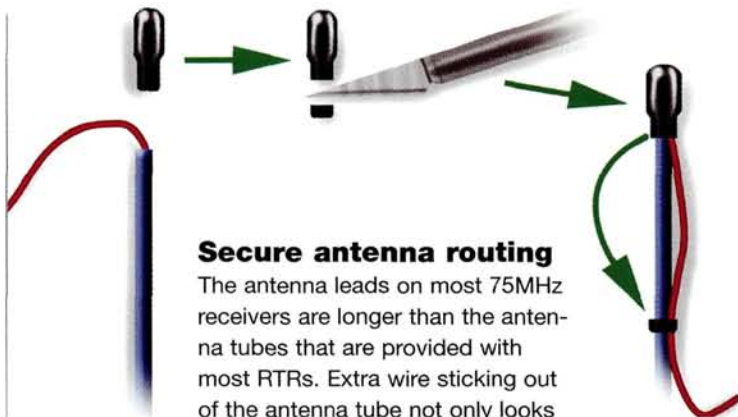


YOUR TIP

T-Maxx simplified shock mounting

Dale Marcus > San Antonio TX

The front and rear inboard-mounted shocks on Traxxas trucks can be a pain to remove because of the difficult-to-access shoulder screws that secure them to the tower. To change this, install the shocks with Team Associated's Monster GT shock-mounting hardware (item no. 25070) instead of the eight shoulder screws that came with the truck. You'll have to drill the shock-mounting screw holes all the way through the shock tower with a 3mm drill bit (or one of a similar size) so a pair of inboard and outboard shocks can be mounted to the shock tower with a single screw and nut. This mod significantly simplifies shock mounting.



Secure antenna routing

The antenna leads on most 75MHz receivers are longer than the antenna tubes that are provided with most RTRs. Extra wire sticking out of the antenna tube not only looks hack, it also exposes the antenna to damage. For a cleaner and more secure installation, cut 2mm off the open end of the rubber antenna cap, feed the antenna lead through the tube, and secure the extra wire to the outside of the antenna tube with the ring that you just cut. Then slide the endcap over the tip of the antenna.



Revive your Dremel tool bits

Dremel sanding drums and tool bits can easily become glazed and dulled with normal use, especially if you grind a lot of plastic and Lexan. These materials melt quite easily from the friction of the sanding, and that can leave a mess of melted plastic on the drum. I've seen racers throw away those bits, and that is a waste. You can usually bring a Dremel bit back to life by grinding the surface with a diamond-faced file (available at most hardware stores). Install the bit on the Dremel, and spin it at $\frac{3}{4}$ speed. Use the file to remove the glazed-over sections or melted plastic. ■



WE WANT YOUR TIPS!

If we publish your tip, you'll win a 6-month subscription (or extension) and a chance to win the "Tip of the Year" grand prize: an OFNA RTR. Email your tips to GeorgeG@airage.com. Include a photo or scan a sketch if you can. Snail mail? Write to Pit Tips, 100 East Ridge, Ridgefield, CT 06877-4606 USA. Be sure to write your name, address and phone number on each tip you submit.

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We screen all Pit Tips for functionality, feasibility and safety but do not test them all. RC Car Action is not responsible if you mess up your gear or yourself by using the tips given here. If you aren't comfortable following any tip we show—DON'T!

Loose suspension pins

Q I bought a used Inferno MP-7.5 K2 on eBay. I think it was a good deal because I got it for a very good price and the buggy runs fantastic. I did notice, however, that the pins that secure the shocks to the suspension arms always back out. The pins are held in place with setscrews that are threaded into the suspension arms, and I've tightened the setscrews so many times that I stripped the plastic. Now the pins back out after a few minutes of running. Do you guys know of a better way to secure the pins to the suspension arms?

Scott Lazlow
Alhambra, CA

A A couple of things might help keep those pesky pins in place; however, the most bulletproof method is to secure the shocks to the suspension arms with 3x15mm machine screws instead of using the stock pins. The screws will thread into the suspension arms and won't back out. If you don't have machine screws, you can grind flat spots in the pins where the setscrews seat. This will prevent the pins from dislodging if the setscrews back out a little bit.



Most Kyosho team drivers replace the shock-mounting pins with 3mm machine screws because they better secure the shocks to the suspension arms.

REAL PERFORMANCE PRODUCTS!

T-Maxx/2.5-Maxx Steel Top Shaft

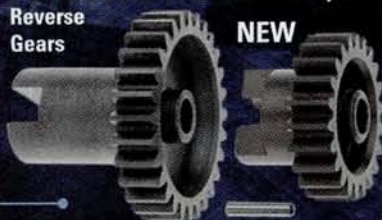
NEW



This precision machined **hardened** steel top shaft will fit all T-Maxx. Includes oversize ball bearing. RRP 8525

T-Maxx/2.5-Maxx Forward Primary and Reverse Gears

NEW



This kit contains a precision machined **hardened** steel primary forward gear, a **hardened** aluminum reverse gear and pin. RRP 8521

T-Maxx/2.5-Maxx Primary Reverse Gear

This gear is precision machined from solid aluminum and **hardened**. Includes pin. RRP 8522

NEW

T-Maxx/2.5-Maxx FORWARD ONLY Steel Gear Kit

NEW



This kit contains a 26T **hardened** steel output gear, a forward drive hub adaptor, steel spacer and Pin. RRP 8586. **Hardened** aluminum version RRP 8585.

T-Maxx/2.5-Maxx Hardened Forward Primary Gear

Precision machined from solid steel and then **hardened**. RRP 8529
Hardened aluminum version RRP 8528.

NEW

www.robinsonracing.com

MAKE NO COMPROMISES!

T/E-Maxx/2.5-Maxx Accessory Spurs



A wide range of spurs fit our Double-Disc Slipper Kits. Choose from machined Super-Tough plastic spurs in 66, 68, 70, 72, 74 and 76T sizes, RRP 82XX, or CNC machined steel spurs available in 65, 72 and 76T sizes, RRP 83XX. Small Clutch Plate/Gear Adaptor fits 65 thru 70T spurs. Large Clutch Plate/Gear Adaptor fits 72 thru 76T spurs.

T-Maxx/2.5-Maxx Lightened Spur And Double-Disc™ Slipper Kit



RRP's NEW line of Lightened Spur and Double-Disc Slipper Kits for Traxxas Nitro and T/E-Maxx/2.5-Maxx trucks are designed to improve performance and increase reliability. This combo incorporates a machined steel or Super-Tough plastic spur, a Vented Aluminum Clutch-Plate/Gear Adaptor, 2 Slipper Pads and Plates to deliver the adjustability you need and the increased performance that you demand. **Complete Slipper Kits** are available in the following sizes: RRP 8166 Slipper Kit with 66T Super-Tough plastic spur (Stock Size) for E-Maxx; RRP 8172 Slipper Kit with 72T Super-Tough plastic spur for Traxxas Nitro; RRP 8465 Slipper Kit with 65T Steel Spur for Traxxas Nitro; RRP 8472 Slipper Kit with 72T Steel Spur (Stock Size) for T-Maxx. Spurs, Clutch-Plate/Gear Adaptor and Slipper Pads also sold separately.

sponsored by



Bound-up suspension

Q I race my Traxxas Stadium Maxx at a local track. It was time for a thorough cleaning, so I partially disassembled it. After removing the front shocks, I noticed that the suspension arms don't pivot as smoothly as they did when the truck was new. I suspected that bent suspension pins might be causing the binding problem, but they're perfectly straight. I also checked the steering-turnbuckle rod ends, and they're in good shape, too. What's causing the binding? [Email] Cecil Devaro

A Check the pivot balls installed inside the steering hubs. Dirt can build up between the pivot balls and pivot-ball caps and cause binding problems. Try loosening the pivot-ball caps slightly. In many cases, this will solve the problem, but your best bet is to clean the hub carriers thoroughly.

Remove the hub carriers from the vehicle by unthreading the pivot balls from the upper and lower suspension arms. Next, remove the pivot-ball caps, pivot balls and bearings from the hub carriers. Clean all the components thoroughly, and then reassemble your truck.

Make sure that you don't overtighten the caps that retain the pivot balls inside the hub carriers, or you'll end up with binding problems again. Tighten the caps until they contact the pivot balls, and then back the caps out $\frac{1}{8}$ turn.



Above: sometimes, loosening the pivot-ball caps slightly will cure a suspension-arm binding problem.

Left: your best bet, however, is to thoroughly clean the pivot-ball suspension components to ensure smooth operation.

T/E-Maxx/2.5-Maxx Steel Diff Gear Set



T/E-Maxx/2.5-Maxx differential gear set, includes: 1 beveled pinion gear, 1 beveled spur gear, 4 re-usable stainless steel Phillips head screws, 1 tube Associated Black Grease, and a shim kit for spider gears with 10 .003" shims. 2 sets needed per truck. RRP 8590

T-Maxx/2.5-Maxx Aluminum High Performance Brake Kit



New, lightweight aluminum high performance brake kit, includes bigger, more aggressive brake pads and steel backing plates. One piece vented rotor minimizes side-to-side wobble. Also fits newer T-Maxx. RRP 8562. Older style half shafts use Brake Kit RRP 8560.

DON'T SETTLE FOR SECOND!



www.robinsonracing.com

T-Maxx Vented Flywheels



Aluminum vented flywheels move air over clutch bell, improving performance and cooling. RRP 8551 Blue, RRP 8550 Natural Silver. **NEW 2.5-Maxx Vented Flywheel, Blue Only RRP 8552.**

T/E-Maxx/2.5-Maxx Replacement Pinion



This precision machined steel pinion fits RRP 8590 Diff Gear. RRP 8591

T-Maxx/2.5-Maxx Hardened Steel Clutchbells



CNC Machined from solid steel these bells are built to last. They take the 5x11 bearing (NOT included). Available in 19T, RRP 8119, 20T RRP 8120, 21T RRP 8121 and 23T RRP 8123.

ROBINSON RACING PRODUCTS

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Paragon and Niftech both offer odorless traction compounds that are a lot less offensive to the nose. Keep in mind that they still emit an odor, but most people aren't bothered by it. I like the Niftech stuff because it dries more quickly, and you don't have to wipe down the tires after the compound has dried.

Sticky situation

Q I work in a parking garage in downtown LA. The fourth floor is reserved for long-term parking and has very little traffic. We built a small track there with PVC pipe and Road Dome corner markers to race electric touring cars at lunch. In an effort to keep the racing fun and inexpensive, we use long-lasting rubber slick tires. Unfortunately, the cars slip and slide all over the slick cement surface unless we treat the tires with Paragon traction compound. We received complaints about the smell of the traction compound and had to stop using it. We've tried to find alternatives, but nothing seems to work. Do you know of any traction compounds that don't stink?

Thomas Dwithauer
Los Angeles, CA

A I must be crazy because I like the smell of Paragon traction compound. It smells like Simple Green and bubblegum to me. Unfortunately, some people can become nauseated when exposed to the smell for long periods of time. Paragon and Niftech both offer odorless tire sauce for use at indoor tracks that require it. These formulations *still* have an odor, but it isn't anywhere nearly as strong as the standard compounds.

RC10-GT Steel Combo



Precision machined from solid steel, then hardened, this 65T spur and 15T bell combo will last and last. RRP 2365

RC10-GT Hardened Steel Idler Gear



Cut from solid steel stock, this RC10-GT gear is lightened and hardened for super quiet precision and extra long life. Black tranny grease included. RRP 2213

Associated Titanium Stealth Top Shaft



CNC Machined from solid titanium, this super hard, super light top shaft will fit any Stealth transmission. RRP 1512.

RC-10GT Hardened Steel Clutchbells



These steel Clutch Bells are CNC machined from solid steel then the teeth are machined on. This makes the part stronger with less gear "run out". Available in 14T thru 20T, 22T and 24T. RRP 22XX

www.robinsonracing.com

RC-10GT 32 Pitch Spurs



Precision machined from heat-resistant, super tough plastic, these spurs mesh flawlessly with our Clutchbells. Available in 63T thru 67T. RRP 2263 - RRP 2267.

Hardened Diff Gear



Hard anodized, precision CNC machined aluminum diff gear. RRP 1513 RC10-GT

DON'T SETTLE FOR SECOND!

TC3 Ultra 48 Pitch Spurs



Precision machined from heat-resistant plastic, these spurs mesh flawlessly with our pinions. Available in even numbers from 70T thru 80T. RRP 1670 - RRP 1680.



sponsored by

RRP
ROBINSON RACING PRODUCTS

Loose transmitter batteries

Q My 5-year-old Airtronics M8 is starting to give me problems. For some reason, the power light turns on and off whenever I jiggle the transmitter, and that is causing serious glitching problems. I was told that I need a new dry-cell battery holder, so I ordered it. A couple of weeks have gone by, and it still hasn't come in. I haven't run any of my cars in a while, and I'm starting to have withdrawal fits. Is there a way to fix the battery tray I have until I get my replacement? [Email] **Parker Daniels**



Insert the tip of a flat-blade screwdriver between the coils and stretch the spring (2 to 3mm is plenty) to make it slightly longer.

A It sounds as though one or more of the coil springs that secure the batteries tightly in the battery tray might have lost their tension, and that is causing the battery (or batteries) to slide around enough to momentarily lose contact. Try stretching the coil springs slightly (make them longer) to create a little more tension to hold the batteries securely in place. As a regular maintenance regimen, you should check the battery tray for proper coil-spring tension from time to time.

TOOLBOX

Venom Micro Temp

Venom Racing's new Micro Temp is 40 percent smaller than the original to reduce weight and make it easier to install in tight places. It has all of the same features, including one-button high-temp technology that records the highest temperature reached during a race. This extremely useful info helps you tune the engine for greater performance. It also displays engine temps in "real time," and it's super-easy to install. The Micro Temp is available in purple and green, and it includes a battery.



Venom Micro Temp—item no. VEN0601; \$29
Venom Racing (800) 705-0620; venom-racing.com.



Send your "Troubleshooting" questions and comments to troubleshooting@airage.com, or mail them to "Troubleshooting" c/o RC Car Action, 100 East Ridge, Ridgefield, CT 06877-4606 USA.

HPI Savage 21 Nitro Steel Combo



This new 52 tooth Spur and 14 tooth Clutch Bell are CNC machined from solid steel and then hardened for unmatched performance and durability. RRP 7052

NEW

HPI Savage 21 Nitro Vented Flywheel



Aluminum vented flywheels move air over clutch bell, improving performance and cooling. RRP 7000

NEW

Stealth Spurs



These precision machined spur gears are super quiet. They're available in 48P in 60T thru 96T sizes, and fit any Associated or HPI electric car or truck. RRP 1860 thru RRP 1896.

Electric Car And Truck Pinions:

48P Absolute Series Pinions



Super hard, lightened and cut with unmatched precision. Great with any spur, but with an Absolute spur, even on-off noise is gone! Available in 48P in 16T thru 28T sizes. RRP 1416 - RRP 1428.

48P / 64P SuperLite Aluminum Pinions



They're lightened, hard coated and precision cut. Available in 48P in 16T thru 28T, and 64P in 24T thru 38T. RRP 30XX (48P) and RRP 31XX (64P). Only \$5.25

48P Hard Nickel Plated Steel Pinions



These precision cut gears have an extremely hard coating that makes them really last. Available in 12T thru 35T. RRP 1012 - RRP 1035

ROBINSON RACING PRODUCTS

4968 Meadow View Drive · Mariposa, CA 95338 · Voice 209.966.2465 · Fax 209.966.5937

www.robinsonracing.com



MEET THE 777'S LITTLE BROTHER

Any true RC fan knows the name Kyosho is synonymous with $\frac{1}{8}$ -scale buggies. With six IFMAR World Championship awards in the company's trophy case, the K-car guys know a thing or two about open-wheel off-roading. So it only makes sense that they would go with what they know when entering the mini-off-road scene and launch a 4WD buggy. But not just any ol' design; this new machine is a nearly perfect replica of an Inferno 777, but with electric power and at half its size. Kyosho even dubs the new size "Half-8," as in one half of $\frac{1}{8}$ scale, or $\frac{1}{16}$ scale—slightly larger than the $\frac{1}{18}$ -scale stuff we've been seeing. The Half-8 Mini Inferno is fully adjustable and every bit as racy as a "full-size" Inferno. I should know; I drove one myself! Here's the proof.



Kyosho Half-8

MINI

SPECS LENGTH: 10.6 in. (270mm) WHEELBASE: 6.9 in. (176mm) WIDTH: 5.8 in. (148mm) WEIGHT: 28.2 oz. (800g)

WHEEL DIMENSIONS: 2.5x1 in. (64X25mm) MOTOR: 380 FINAL DRIVE RATIO: 10.8:1 TUNING ADJUSTMENTS: REAR TOE (INCLUDES ARM MOUNTS FOR 3 SETTINGS) ■ FRONT CASTER (INCLUDES 20- AND 22-DEGREE FRONT HUBS) ■ FRONT & REAR CAMBER ■ SHOCK POSITION ■ DAMPING W/OPTIONAL OIL-FILLED SHOCKS; FRICTION SHOCKS ARE STANDARD ■ SERVO-SAVER TENSION ■ SLIPPER CLUTCH ■ SUSPENSION DROOP ■ WING ANGLE ■ SWAYBARS (OPTIONAL)



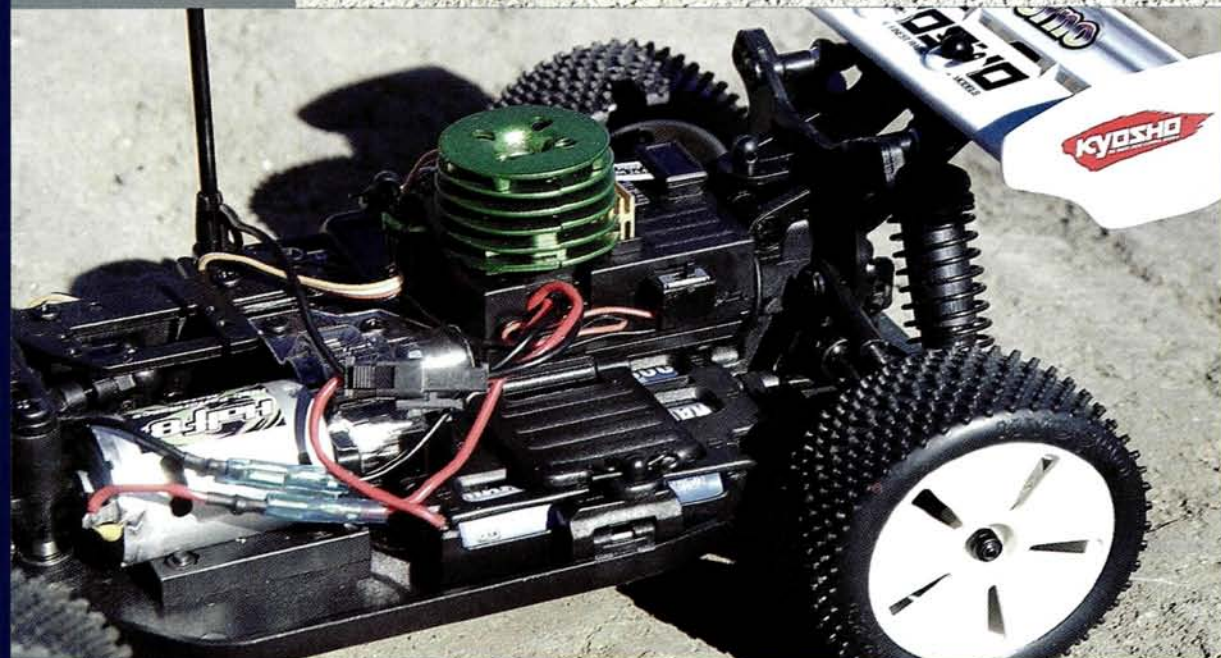
INFERNO



The Half-8 Mini Inferno looks just like a shrunk 1/8-scale buggy. All of the suspension components resemble the MP 777's. Caster, camber, toe, shock location, ride height and even droop are adjustable. The Mini Inferno will come with friction shocks, but expect oil-filled hop-ups as soon as these little buggies are available.



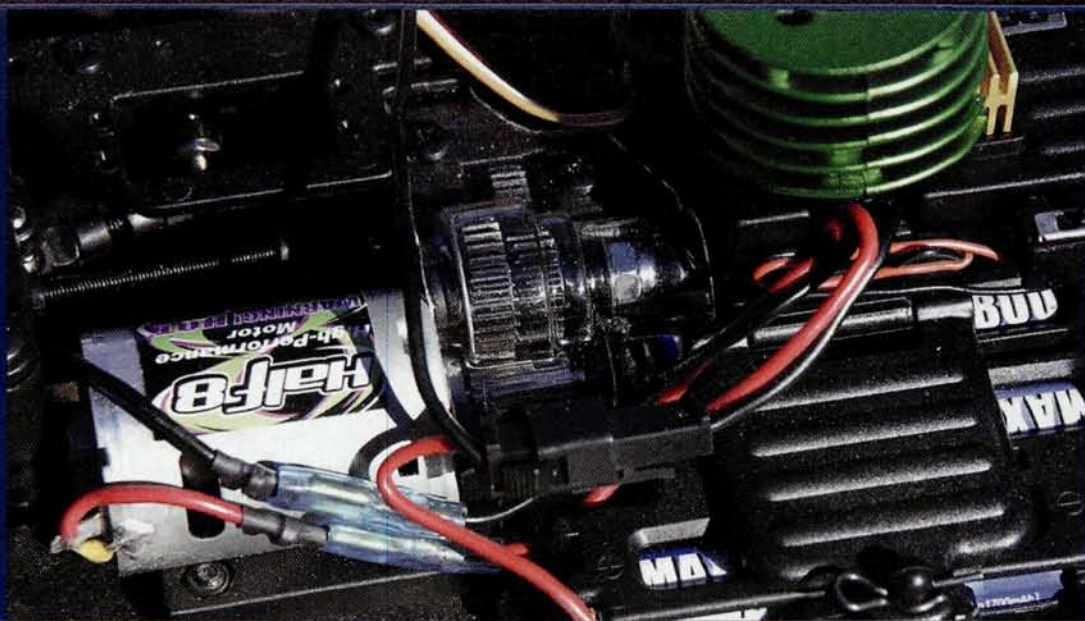
Just like the front suspension, the rear is fully adjustable. According to Kyosho, the car will come with three toe-in blocks, and optional swaybars will be available. Even the wing angle is adjustable.



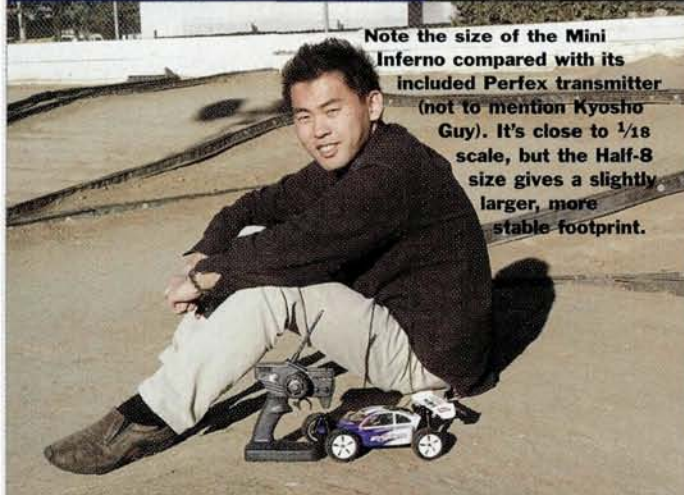
The green heat-sink head is plastic, and it's strictly a styling piece, since the Mini Inferno is electric. You can see the combination receiver/speed control unit under the faux head and the flip-open battery tray under the electronics. Six AA alkaline cells or 8 2/3A cells (not included) can be used to power the Half-8 Mini Inferno, and the juice flows to a 380 motor—a nice step up from the 280 powerplants most other minicars use.



You can see the adjustable slipper clutch under its clear cover. Note the Half-8 380 mod motor; the buggy isn't even out yet, but Kyosho already has upgrades for it.



Note the size of the Mini Inferno compared with its included Perfex transmitter (not to mention Kyosho Guy). It's close to 1/18 scale, but the Half-8 size gives a slightly larger, more stable footprint.



The mini-tires have big-buggy proportions and are taller than typical 1/18-scale off-road rubber. The compound felt soft, and the tires hooked up at Hot Rod Hobbies. The slotted wheels are just like the 777's, and foam inserts will be included.



Left: were it not for the seemingly giant hand that holds the wing, you'd swear this was a "full-size" 1/8-scale buggy. Note the blisters that allow the diffs to sit as low in the chassis as possible and the "ears" under the suspension arms for droop settings. Not many screws here; you have to take out only four screws to remove the rear end and six screws to remove the front end.



QUICK DRIVE

I saw the Half-8 Mini Inferno in action when I tagged along on an official Kyosho photo shoot at Hot Rod Hobbies with team driver Jeremy Kortz. With only three of the new buggies in the entire United States, I didn't expect a turn at the wheel, so I was stoked when the Kyosho guys offered me the transmitter. The buggy I drove was modded with oil-filled shocks, a hotter motor and an 8-cell 2/3A NiMH saddle pack. The rest of the buggy was completely stock. I felt comfortable with the little car after just a couple of corners, so I got on the gas and ripped up Hot Rod's hard-packed, 1/10-scale track. It was sick! I was able to triple large, 1/10-scale jumps, and the suspension was very well sorted. I expected a much bumpier ride from a mini, but the Inferno did a great job of flattening the track. It won't be as dialed in stock form with less power and undamped shocks, but in modified trim, this might just be the toughest 1/16-scaler on the block. Stay tuned for a Track Test and an in-depth article about the Half-8 Mini Inferno in the next issue of *RC Car Action*. ■

FIND IT

Go to page 244 for manufacturers' contact information.

Tamiya **Volkswagen Race-Touareg**

This rally ride is super-scale—even under the bodywork



Full-size racing often inspires Tamiya to create a new RC car or truck, and the Dakar Rally has long been a source of inspiration. Remember the Porsche 959 4WD—Tamiya's first scale-looking car that was capable of running in dirt and racing in parking lots? Now nearly 20 years later, the Dakar Rally has spawned another RC vehicle for Tamiya—the Volkswagen Race-Touareg. Underneath the Volkswagen body is Tamiya's CC-01 chassis, also known as the Cross Country. It's a 4WD design with a unique layout: front-motor with independent front suspension and a solid rear axle like a full-size SUV.



KIT FEATURES

CHASSIS. The Race-Touareg's plastic tub chassis is unlike any other. Its depth allows wheel wells to be molded into it, and that not only helps keep dirt out of the chassis but also makes the truck look more realistic once the body is on. Typically, you can see around the tires, and the electronics would be visible—but not with this kit. The chassis is also designed with an integrated gearbox and battery tray for a stick pack. The gears for the drivetrain rest in the chassis, and a plastic shroud seals the rotating parts. A large plastic bumper and skidplate protect the front end.

DRIVETRAIN. The drivetrain is one of the features that make the Touareg so cool. A 540 Mabuchi motor is mounted longitudinally in the center of the chassis close to the front tires. A plastic motor mount ensures that the gear mesh between the pinion and spur is correct. Unfortunately, the mount only allows two pinions to be used: a 16T (included) or a 20T (optional). Power is transferred from the spur gear to the front 5-gear, bevel-gear diff via two bevel gears and a counter gear. The extra-large gears are built to stand up to off-roading abuse. The front diff has tough cast-aluminum internal gears and a plastic outer case. Steel dogbones take the power from the diff and relay it to the all-terrain tires.

Here is where the cool factor comes in. The spur gear also spins a counter gear that is mounted under the chassis. The counter gear is connected to a beefy metal universal joint. It drives a long metal driveshaft that has another universal joint on the other end, and that transfers the power back to the rear solid axle. This driveshaft spins just under the chassis, just like one you would find on a real truck. In the rear axle is another 5-gear, bevel-gear diff, but it has a cast-aluminum case. Tamiya also included parts that allow you to build the diff locked (for no diff action) or unlocked (for full diff action), and you can change back and forth between the two. Running with a locked rear diff works great on slippery surfaces or when you are rock-crawling.

I wish Tamiya would swap the plastic and metal bushings throughout the drivetrain for metal-shielded ball bearings. Bushings are fine for the first couple of runs, but they wear quickly, and that causes a lot of slop in the drivetrain. Ball bearings will up the kit price, but they are a must in my book.

BUILDING AND SETUP TIPS

Thanks to its simple CC-01 chassis that doesn't have a ton of parts that need assembly and Tamiya's easy-to-follow instruction manual, the Volkswagen Race-Touareg is a cinch to build; it can be finished in one evening. Below are several tips to make your build go more smoothly.

USE THREAD-LOCK. The instruction manual makes no mention of it, but use it on all fasteners that screw into metal—especially when you assemble the rear diff.

STEP 3: SPUR GEAR. Each step includes a full-size schematic drawing of each part so you can match up the part with the drawing. In this step, the shaft for the spur gear is not drawn to scale, so keep a metric ruler handy.

STEP 8: FRONT LOWER ARMS. Don't make the same mistake as I did: don't screw

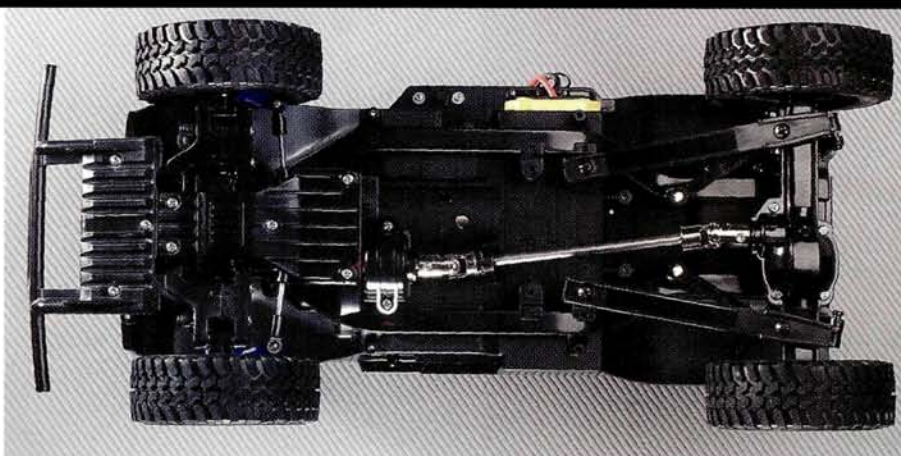
the two halves of the lower suspension arms together first. This step requires that you put the entire lower suspension assembly together at the same time.

STEP 9: ATTACHING STEERING ARMS. Be careful not to overtighten the screws that hold the steering arms onto the chassis because they will bind.

STEP 18 & 19: ATTACHING DAMPERS. The shock springs look as if they are the same size, but actually, the front shock springs are shorter.

STEP 20: Resist the urge to attach the steering-servo arm perpendicular to the servo case. The CC-01 chassis requires the arm to be about 20 degrees from perpendicular for the steering to work properly.

SUSPENSION AND STEERING. Oil-filled shocks with bladder seals offer smooth damping and allow the truck to handle rough terrain. In front, lower H-arms hold C-carriers and steering knuckles and use a solid plastic upper-camber link. The rear setup mimics that of a real off-road vehicle. Two lower and two upper trailing arms help support the Toureg's solid rear axle, and two shocks are mounted just aft of it.



Above: check out the 5mm-thick metal propeller shaft with universal joints that feed power from the motor to the solid rear axle and rear trailing arms. Cool stuff.

Left: removing a gear cover on the inside of the chassis allows easy access to the rugged drivetrain gears.

SPECIFICATIONS

MANUFACTURER Tamiya

MODEL Volkswagen

Race-Touareg

SCALE 1/10

PRICE \$190

Varies with dealer

DIMENSIONS

Wheelbase 10.59 in. (269mm)

Width 7.44 in. (189mm)

WEIGHT

Total, as tested 52.31 oz.

(1,483g)

CHASSIS

Type Molded tub with integral gearbox

Material Plastic

DRIVETRAIN

Type Enclosed gearbox

Primary 16T pinion/80T spur gear

Transmission ratio 2.933:1

Final drive ratio 14.67:1

Driveshafts (F/R) Steel dogbones/solid-axle

Differentials 5-gear, bevel-gear

Bearing type Plastic and metal bushings

SUSPENSION

Type (F/R) Lower H-arm with fixed upper-camber link/trailing arm with solid rear axle

Shocks Molded-plastic, fluid-filled with bladder seals

WHEELS

Type One-piece, plastic

TIRES

Type Treaded, all-terrain

ELECTRONICS

Motor 540 Mabuchi

Transmitter/receiver Not included

Servo Not included

Speed control Tamiya TEU-101BK reversing

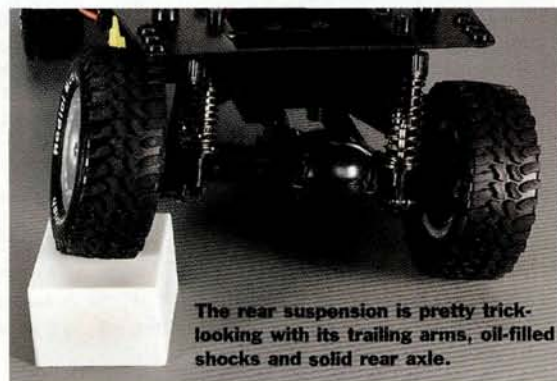
FACTORY OPTIONS

- AV pinion gear set (20T/21T)—item no. 50356
- C.V.A. mini-shock unit set II (2pc.)—50519
- High-torque servo-saver—51000
- 1150 sealed ball-bearing set—53008
- 850 sealed ball-bearing set—53030
- 1260 sealed ball-bearing set—53065
- 1510 sealed ball-bearing set—53126
- 1/10 touring car hard joint cup set for gear diff—53218

Partial list; additional options available.

No other RC chassis looks like the CC-01. With its molded-in fender wells and integrated transmission, it's uniquely Tamiya.

Below: here is the inside of the rear axle; the cast-aluminum diff can be built with full diff action or locked.



The rear suspension is pretty trick-looking with its trailing arms, oil-filled shocks and solid rear axle.



The dual-bellcrank steering system is quite simple: metal piano wire connects the bellcranks that use threaded tie-rods for toe links. The left bellcrank is extra long; it reaches into the tub chassis so it can link to the steering servo that has a servo-saver mounted directly onto it.

BODY, WHEELS AND TIRES. When Tamiya creates a body that is modeled after a full-size vehicle, staying true to scale is of utmost importance. The real Touareg has a back end that curves toward the chassis below the bumper line. When a Lexan body is made, it has to be shaped so it can slide off of the mold it is formed on, and if the body curves in, it won't come off the mold. Tamiya did not take a shortcut and mold the rear end straight; it made the body in two pieces. This way, the 1/10-scale Touareg

body will look like its big brother.

Tamiya made it easy to end up with a great-looking finished body. It has a single-color paint scheme that does not require masking because window decals are included, and the rest of the truck is completed using a large sheet of detail decals. I painted the body using Tamiya's polycarbonate metallic-blue spray paint.

The wheels and tires are another key ingredient for creating a realistic model of the rally racer. The tires have meaty truck-style treads with painted white lettering on the sidewalls. No inserts are required because the tires are molded to be rigid. The one-piece plastic wheels require a coat of gloss aluminum paint, and Tamiya's lacquer spray paint did the trick.

INCLUDED ELECTRONICS. The standard-issue Tamiya 540 Mabuchi motor comes with the Touareg and provides just enough juice to the drivetrain to make it fun for tooling around the backyard. Instead of the bulky mechanical speed control that used to be included with Tamiya kits, the Toureg comes with a reversing ESC—the TEU-101BK. Amen! It features pushbutton setup, double-pump-style reverse and reverse lockout, and it sounds a reminder beep if you forget to turn off the speed control after you've turned off your transmitter.

FIND IT

Go to page 244 for manufacturers' contact information.



The realistic wheels and tires look just like the ones that are used on the real rally Touareg complete with the same wheel design and painted white lettering on the tires.



The front suspension features a typical lower H-arm and fixed camber link that support a C-carrier and steering knuckle.

LIKES

- > Climbs rough terrain easily.
- > Very easy to assemble.
- > Realistic-looking rear suspension and tires.
- > Includes a forward/reverse ESC.

DISLIKES

- > No ball bearings.
- > Rolls over fairly easily.
- > Can only use 16T or 20T pinions.

YOU'LL NEED

- Radio
- Servo
- Stick pack
- Charger
- Tire glue
- Paint for body
- Paint for wheels

WE USED

- Hitec Aggressor AM transmitter and receiver
- HS-311 standard steering servo
- Trinity Time Warp 1900mAh
- LRP Pulsar Competition 2
- Team Losi Beadlock
- Tamiya polycarbonate spray paint
- Tamiya lacquer spray paint



PERFORMANCE

I have never had an RC vehicle with a chassis similar to Tamiya's Volkswagen Race-Touareg, so I did not know what to expect. Pavement was the first test site, and the smooth surface was a perfect place to get a feel for the truck's acceleration and top speed. The reversing ESC does a great job of dumping power into the stock motor, so all four tires grab for traction; the car jumps off the line in a flash and quickly gets up to a top speed of 12.6mph. The Touareg is no land-speed record-setter, nor was it intended to be. It will launch hard without any wheel hop and can hold a straight line without your having to chase it with constant steering input. Grabbing full brake brings the Touareg to a skidding, wheels-locked stop in a short distance, and when the brakes are applied lightly, the truck will slow without the tires locking up. A nice feature of the ESC is the double-pump method to activate reverse, you can hit the brakes without worrying about sending the truck into reverse by accident and damaging the drivetrain.

The Touareg has a high center of gravity (CG) with a narrow track, and that makes it prone to rolling over. If you keep this in mind and don't push it too hard, the truck will stay shiny-side up. Quick left-to-right turns do not unsettle the truck much—unless it is carrying too much speed. The shocks are stiff and compress slightly, so the wheels stay planted. At higher speeds, the truck tends to roll over, but this is gradual and can be easily corrected by turning into the roll.

Next, I drove the rally wagon back and forth between the pavement and the grass and dirt area that outlines the parking lot. When off-roading, the truck could soak up small and medium-size bumps without any problem. On the rough stuff, the truck bounces, and because of its narrow width, it rolls over. Where the truck excels, is in climbing obstacles like large roots and rocks. The stock motor and the large, tough gears give the truck plenty of torque, and the 4WD drivetrain lets it conquer these obstacles with ease. Being able to input power slowly and smoothly is important for crawling, and that makes the TEU-101BK ESC a valuable addition to the Touareg. The old mechanical speed controls had only three forward speeds, and the power did not come on smoothly. I did get it stuck a couple times

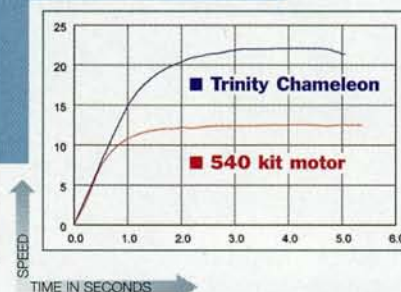


by high-centering the chassis on a tree root and on a curb. As long as the approach is at an angle, the SUV will crawl right over.

I wanted to add more ponies to the Touareg, but I had to be careful not to install too powerful a motor that would damage the ESC. I chose Trinity's Chameleon 2 Pro motor which is a 19-turn and mild enough for the speed control; it gave the truck more than enough power. The tires could easily break free if you grab full throttle, and the top speed went from 12.6mph to 22.11mph (check out the acceleration-per-second curve on the radar-testing chart). Sweet!

After testing, I gave the Touareg an inspection and found that the plastic bushings on the axles had a little wear, but the rest of the truck held up very well. Although Tamiya's vehicles are known to be durable, it helps to use thread-lock during assembly.

RADAR TESTING



THE VERDICT

Our performance-oriented rating system isn't really a good match for the Toureg; if we scored on originality, realism and fun, it's a perfect 10. Its faithfully re-created body and realistic-looking chassis lend the Toureg remarkable scale realism. The CC-01 chassis is simple to build and has just the right balance of off-road agility and on-road ability to allow it to be driven almost anywhere. It is designed with scale realism and for fun driving rather than RC racing, and the fact that it rolls over fairly easily and has limited gearing options is readily forgiven. The only thing I would like added to this kit is a complete set of ball bearings, but other than that, this is a keeper.

RATINGS

Instructions	●●●●●●●●	10	Tamiya's instruction manuals make it super-easy to build.
Parts fit & finish	●●●●●●●●	10	The quality is very good, and they go together without any trouble.
Turn-in	●●●●●●●●	6.5	Turn-in is quick, but with its high CG, it will roll over.
Corner speed	●●●●●●●●	6	With its high CG and narrow track, the Touareg will flip even at moderate speeds.
On-power steering	●●●●●●●●	7	4WD helps it around turns, but the truck will push if the wheels break traction.
Braking	●●●●●●●●	9	The TEU-101BK ESC has strong brakes that can lock up all four wheels on loose dirt.
Bump handling	●●●●●●●●	7	The oil-filled shocks soak up small and medium-size bumps well, but the narrow chassis is easily upset.
Jumping	●●●●●●●●	5	There isn't a lot of suspension travel, and jumps make the chassis bottom out easily.

Best buyer>>> Tamiya fans, especially rally guys, and all fans of unique, realistic RC.

DuraTrax Pumps Up its Purple Pavement Eater

DuraTrax's original Street Force GP nitro sedan came with plenty of high-performance features at a very affordable price. The new Street Force GP2 takes that car to a new level with an extensive list of upgrades and updated parts that put it ahead of the original and position it toward the front of the RTR nitro sedan pack. Let's look at the new GP2.



DuraTrax STREET



FORCE GP2

KIT FEATURES

CHASSIS. The chassis design is very typical of those of cars in the ready-to-run category. The chassis is a stamped-aluminum plate that has been anodized a nice bright purple. It has countersunk screw holes and recessed machined areas for the engine bolts, and parts of it have been machined to reduce weight. Unfortunately, the screw that holds the pipe mount to the chassis is way too big for the original countersink, so the screw head sits well below the chassis' surface. Other than that, the chassis is smooth.

The radio tray is molded plastic and has mounts for the throttle servo, antenna, switch and receiver. The radio switch is just in front of the fuel tank, so be extra careful when you fill the tank; soaking the switch with fuel will cause it to fail.

DRIVETRAIN. The GP2's drivetrain has some high-end design elements. It comes with CV-style driveshafts up front, full ball bearings and ball differentials both front and rear. The drive train itself is an industry-standard, 3-belt design with the middle belt left exposed on the outside of the 2-speed.

The drivetrain ratio is 2.1:1, and there are several different pinion- and spur-gear selections available for the 2-speed, pawl-type transmission to fit just about any track condition if you decide later on that you'd like to race this car.

The drivetrain also features a disc brake with a fade-resistant fiber disc, and the brake linkage has a threaded adjuster for brake adjustments—a nice touch for a ready-to-run car.

ENGINE AND ACCESSORIES. The GP2's .18 DuraTrax engine is built by O.S. and uses ABN construction (Aluminum piston, Brass sleeve, Nickel-plated). The carburetor is a 2-needle, rotary

INCLUDED ELECTRONICS & ACCESSORIES

DURATRAX BY FUTABA TRANSMITTER

The radio is manufactured by Futaba and performs as you'd expect—very well. The transmitter includes steering and throttle trims plus steering dual rate, and it has a servo-reversing switch. The transmitter is very comfortable to hold and is also light.

glow starter.

DURATRAX GLOW STARTER & FUEL BOTTLE

DuraTrax also includes a glow igniter and a fuel bottle to help you get running sooner. The glow igniter uses a C-cell and has a twist-and-lock setup that keeps it securely held to the glow plug when it's starting the



DURATRAX SX100 SERVOS

The SX100 servos have plenty of torque to handle their duties, and their transit speed, though not exactly the world's fastest, is acceptable for a car in this price range. The 4 included AA batteries were good for only five runs before I had to change them. I recommend that you buy extra batteries at the start.

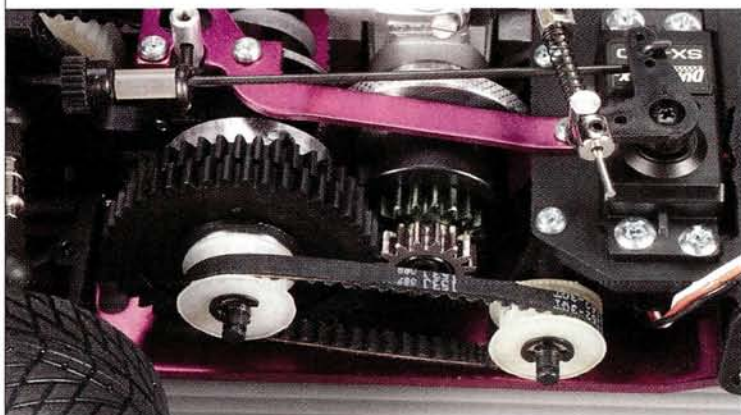
engine.

TUNING DVD

The included engine tuning and break-in DVD explains what the carb needles are and how to use them to tune the engine during and after break-in. One thing I did notice in the video is how rich the engine sounds when DuraTrax says the engine is properly leaned out. Though running your engine rich will certainly make it last longer, it limits the performance of the car. If you want to achieve the claimed 50+ max speed, you'll have to go leaner.

ALKALINE BATTERIES

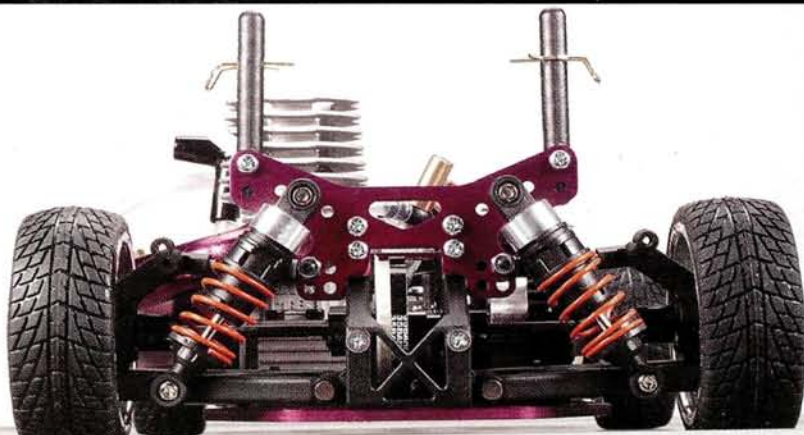
For once, batteries are included! DuraTrax supplies 12 AAs for the transmitter and on-board gear, plus a C-cell for the



The DuraTrax GP2 comes with a cam-style 2-speed. A variety of pinion and spur gears are available to help tune the car to a variety of track conditions.

the engine is very strong and easy to tune right out of the box.

This view shows off the GP2's Pro-Line Road Rage tires, plastic-body shocks, and rear ball differential. Dogbone rear axles are standard, but CV-style units are available.



SPECIFICATIONS

MODEL DuraTrax Street Force GP2

DISTRIBUTED BY Great Planes

Model Distributors

SCALE 1/10

PRICE \$270

Varies with dealer

DIMENSIONS

Wheelbase 10.1 in. (255mm)

Width 7.7 in. (195mm)

WEIGHT

56.7 oz. (1607g)

CHASSIS

Type Plate

Material Stamped-aluminum,
purple-anodized

DRIVETRAIN

Type 3-belt with 2-speed
transmission

Primary 2.875:1 (first gear);

2.21:1 (second gear)

Transmission ratio 2.1:1

Final drive ratio 6.03:1 (first gear);

4.64:1 (second gear)

Belts Standard black rubber

Differentials Ball type

Bearing type Rubber-sealed ball
bearings

SUSPENSION (F/R)

Type Lower H-arm with turnbuckle
camber link

Shocks Plastic-body, oil-filled

ENGINE & ACCESSORIES

Engine O.S.-built DuraTrax .18 (3cc)

Starter Pull-start

Carburetor Rotary 2-needle

Clutch 2-shoe

Pipe Aluminum tuned-type

Manifold Bolt-on, tubular aluminum

Fuel tank 75cc primerless

ELECTRONICS

Transmitter DuraTrax by Futaba, 2-
channel with steering dual-rate

Servos DuraTrax SX-100 standard
type

WHEELS

Type Pro-Line Wabash, chrome

TIRES

Type Pro-Line Road Rage

ACCESSORIES

Glow starter, fuel bottle, tuning DVD,
required dry-cell batteries.

FACTORY OPTIONS

- Graphite radio tray—item no.
DTXC8406
- Graphite shock towers (F/R)—
DTXC9196/DTXC9253
- Swaybars—DTXC9415
(1.8mm)/DTXC9416 (2mm)
- CV rear driveshafts—DTXC7280
- Belt-tensioner—DTXC6106



Left: the GP2 uses resilient StressTech plastic to ward off impact damage. Threaded stiffening rods and capped lower arms help to keep the front suspension rigid.



Right: plastic, oil-filled shocks handle the damping on all four corners, and standard 12mm hex hubs allow the GP2 to wear any standard touring wheel (not that you'll be in any hurry to get rid of the flashy Pro-Line Wabash stockers).



THE COMPETITION

VEHICLE >> REVIEWED
 Associated Nitro TC3 RTR >> 1/0
 CEN CT4-S
 Megatech Razor XT >> 12/01
 OFNA LD3 RTR >> 11/03
 Traxxas Nitro 4-TEC >> 6/03
 Yokomo GT4 RTR

STREET FORCE GP2

design for full mixture adjustability.

The engine exhausts through a purple-anodized tubular aluminum manifold and tuned pipe. The parts are nicely made, but their alignment is skewed a bit and leaves an undesirable gap between the two pieces; this could cause a coupler failure. Finally, the fuel tank leaked, but with one call to DuraTrax customer support, a replacement part was shipped out to me promptly.

SUSPENSION AND STEERING. The suspension is a proven, lower A-arm, upper camber-link design. Notable additions are the upper tie rods that run from the front suspension from the radio tray to the caster block; they significantly stiffen the front suspension. There are adjustable tie rods on all of the links and downstop setscrews in all four suspension arms.

The plastic-body shocks are a double O-ring, bladder design. The upper cap is machined aluminum with a plastic insert for the upper mount. The lower O-rings are held in with a plastic cap that makes changing the O-rings pretty simple. Spring adjustments are handled by using clips between the springs and the top of the shocks. The damping feels fairly heavy; we'll see how this affects handling later.

The steering system is a standard bellcrank setup, with an adjustable servo-saver built into the left 'crank. The biggest feature is DuraTrax's Stress-Tech Guarantee, that guarantees nearly all the car's molded parts against breaking for a full year from the date of purchase. That includes high-stress items such as the lower arms and the steering components.

BODY, WHEELS AND TIRES. The body has an aggressive design and much better graphics than the original Street Force. It's

mounted and cut out (including the side window on the left side) to allow better cooling and easier access to the fuel tank, but it's not quite "RTR." The antenna hole wasn't drilled at the factory, and the rear wheel wells had to be trimmed to prevent the tires from rubbing against the body. Also, the manifold pushes the body out from the chassis. .

Pro-Line Road Rage tires come glued to a set of Pro-Line Wabash rims. The Rage's realistic tread looks great on the chrome wheels, and the rubber compound feels firm, so the combo should wear well.

TUNING

WINGIN' IT

Use a body ream to drill a hole through the wing and its mounting pylons, then secure the wing with 4-40 or 3mm nuts and bolts instead of the supplied tape.

SHARPER STEERING

Set up the front end with a half-degree of toe-out. This will improve turn-in and help the car track straighter under acceleration.

ADD AIR FILTER OIL

Make sure you oil the air filter. Any thick, petroleum-based oil will work better than nothing at all, but genuine air-filter oil is best.

THROTTLE LINKAGE FIX

For smoother action, install the linkage in the upper hole on the arm on the carb, and reposition the servo arm so it's perpendicular to the throttle servo. This allows the brake linkage to clear the throttle linkage at full throttle and prevents it from binding.

STAY-TIGHT DIFFS

When you rebuild the differentials, put thread-lock on the adjustment screw. This will prevent the diffs from loosening while the car is running.

LIKES

- > O.S.-built .18 engine is very fast.
- > Pro-Line wheels and tires are standard.
- > Includes tuning DVD

DISLIKES

- > Ball diffs loosened quickly.
- > Body fits poorly over manifold and pipe.

YOU'LL NEED

Fuel
 Reamer or hobby knife
 Air filter oil

WE USED

DuraTrax/O'Donnell 20%
 Trinity body reamer
 DuraTrax



FIND IT

>>> Go to page 244 for manufacturers contact information

PERFORMANCE

Once I had broken the engine in, I took the GP2 out to a big parking lot to let it stretch its legs. Most GP2s will never see a racetrack, and I wanted to see how it would do "in the wild." DuraTrax claims the GP2 is good for "50+"mph, and radar testing confirmed this with consistent passes in the low 50mph range (best run: 53.2). The engine winds up nicely and pulls throughout the rpm range, but the 2-shoe clutch isn't quite able to hook up the horsepower of the big .18 on hard launches. I tried cutting the shoes to lighten them, and that did make the clutch hit harder, but the shoe material isn't quite as grabby as I'd like to see with such a powerful engine.

As far as handling goes, the car worked great in the parking lot; the shocks' firm damping prevented the chassis from bottoming in the big dips and made the car feel very stable at high speed. The GP2 easily handled all the wide, high-speed turns I threw its way. When you play around in a parking lot, it's all about top end and high-speed stability, and the GP2 has both. The large rear wing helps the car stay stuck, and the treaded Pro-Line tires are a good match for parking lot play. They grip well, but are firm enough to outlast their fair share of fill-ups. I'd say the GP2 is completely successful as a parking-lot play machine, but I couldn't resist the urge to see what its powerful engine and 2-speed transmission could do on a racetrack—especially if I gave the suspension a few tweaks.

First, I refilled the shocks with 30WT oil to get more steering out of the car and to make it feel more planted. Swapping out the shock oil helped quite a bit, but I wanted to get it even more dialed in, so I also swapped the tires for softer racing rubber. I noticed a dramatic difference immediately; remember, the right tire choice is one of the biggest factors when it comes to getting your car hooked up.

Once I had the car more dialed in, I had to address the differentials. As soon

as the car started to hook up coming out of the turns, the diffs loosened and wouldn't stay tight for more than a few minutes. To remedy this, I took the diffs out and put thread-lock on the adjustment screws. This fixed the problem.

Back on the track, I turned a few more hot laps before deciding there was still more tuning to be done. I experimented with roll center by raising the rear outer camber link one hole, and the car improved a little more. It was fun to drive and handled decently on the track. Though the servos are not the fastest in terms of transit time, they were more than up to the task of wheeling the car through the turns, and they kept it tracking straight down the straightaways and had plenty of torque to lock the brakes. I found it hard to get the brakes completely dialed in. I couldn't get them to modulate well: when I grabbed the brakes, they seemed about to lock. I thought that the stock spring on the brake linkage might be a bit too stiff, so I replaced it with a small section of fuel tubing that gave me more progressive brake action. Also, if fuel gets onto the stock fiberglass disc, it tends to slip because the fiberglass is porous and will absorb the oil in the fuel, so be careful to keep it dry!



THE VERDICT

DuraTrax has done a good job of updating the Street Force platform. The redesigned body and graphics look great, and the addition of genuine Pro-Line wheels and tires gives the car a street-ready stance. I was particularly impressed by the power of the GP2's new .18 engine and its reliable operation, and the GP2's

high top speed. If you want to win the neighborhood speed wars, this could be the car to do it! When you compare features and miles-per-hour per dollar, the Street Force GP2 comes up as a fast, affordable way to pound parking lot. ■

RATINGS

Instructions	●●●●●●●●	□	Full tuning and maintenance instructions, and there's even a DVD.
Included electronics	●●●●●●●●	■	Futaba-designed gear works well; steering could benefit from faster servo.
Parts fit & finish	●●●●●●●●	■	Good quality and finishes overall, but some of the countersunk screws don't fit flush.
Turn-in	●●●●●●●●	↵	Heavy understeer when pushed hard on the track, but parking lot drag racers aren't likely to mind.
Corner speed	●●●●●●●●	↵	Corner speed suffers due to hard tires, firm damping. Not an issue for play driving.
On-power steering	●●●●●●●●	↵	Firm tires and damping numb steering, but make the car first-timer friendly.
Braking	●●●●●●●●	■	Very strong, but a little hard to modulate.

Best buyer>>> Nitro sedan fans out for high-speed parking-lot play.

Back in 1996, Thunder Tiger Racing (TTR) got its start in 1/8 scale with the Mirage buggy. It was a low-dough beginner buggy, but as 1/8-scale off-road racing became more popular, TTR upped its performance steadily with Pro and V-Spec versions. By 1999, TTR was ready for an all-new design, and with the help of pro racer Richard Saxton, the EB-4 was born. Out of the gate, it was a winner, and it took the top podium spot at the 1999 Silver State Nitro Challenge with Saxton at the wheel. Changes have been made to the original platform to keep it competitive, but for 2005, Thunder Tiger decided it was once again time for an entirely new ride. The new car still has "EB-4" in its name, but the new S3 model shares nothing with the previous car. In fact, it brings new features to 1/8-scale off-road racing that no other brands have tried, including an extruded chassis and actively valved shocks that automatically vary damping. This is one trick ride!



Thunder Tiger

EB-4

S3



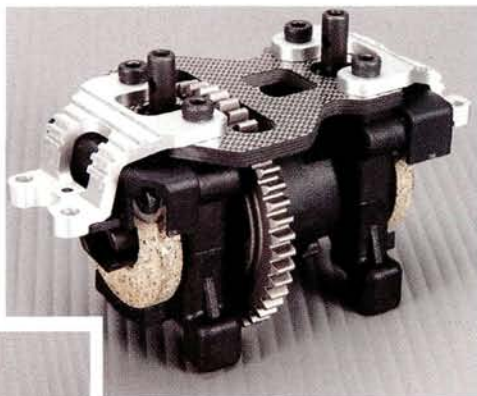
Thinking Outside the Box



KIT FEATURES

CHASSIS. This delta box chassis really makes the EB-4 S3 stand out from the rest of the 1/8-scale buggies. It's made out of aluminum but not aluminum plate; instead, the aluminum is extruded through a die and extensively machined to create the masterpiece shown here. When you bolt in the front and rear diff housings and add the center diff assembly, the chassis becomes very stiff. Hard-anodizing protects the surfaces, and all the screw holes in the bottom of the chassis have been countersunk to keep it smooth. Dimples under the front and rear diffs allow them to be mounted as low as they can go, and gaskets between the diff housings and the chassis effectively keep dirt away from the gears. Molded side guards are bolted to both sides of the chassis to keep dirt out and protect the internals. The servos and receiver box are mounted on the chassis' right side; the engine and fuel tank are on the left. The receiver box has an easy-to-remove, pivoting lid that allows access to the goodies inside. The downside is that it interferes with the throttle linkage and makes it difficult to remove and install. The servo mount is a piece of carbon fiber, and the steering servo is in the laydown position to lower the car's center of gravity. A transponder mount hangs off the side and is molded to accept both standard and personal transponders.

The one-piece receiver box has enough room for a receiver, a flat receiver pack and any excess servo wire you may have. The wing mount is attached to the



Above: both brake linkages are on top of the top plate where they can be easily accessed. The diff mounts are two-piece units, and that makes removing the center diff a snap.

Left: the ring and pinion gears are machined out of steel and have spiral-cut teeth for extra strength.



BUILDING AND SETUP TIPS

My S3 build went smoothly, and anyone with nitro experience shouldn't have any trouble getting it together. Here are a few tips to make that build go even better.

SCREW CEMENT. That's a different way to say thread-lock, so where you see the yellow bottle labeled "Cement," use blue thread-lock—not CA!

STEP 2. When you have more than one diff to go into a car, mark them right away: I just scribe an "R" for rear, "C" for center and "F" for front so I don't install them incorrectly. They contain fluids of different weights, and if you put them in the wrong places, you'll adversely affect handling.

STEP 3. You should install the center drive shaft before you install the diff and button up the diff housing. By doing that, you'll be able to make sure that the joint is tight on the pinion and that the pinion is properly seated in the diff housing.

STEP 6. When you install the aluminum screws that hold the pivot balls in place, thread them by hand to get them started to avoid cross-threading them and ruining the hubs.

STEP 6 AND 7. Don't over-tighten the setscrews in the swaybar mounts. When they bottom out, back them off a turn or so to allow the swaybar to move freely.

STEP 9. When you install the servos, use the rubber grommets that are supplied with them. They protect the servos from engine vibration, and if you don't use them, your servos may contact the lower chassis.

rear diff assembly, and the two halves are supported in the center by three posts. The wing's angle can be adjusted thanks to the three screws at the front of the mount.

DRIVETRAIN. A 3-shoe clutch and a 13-tooth clutch bell get the S3 moving. The most recent 1/8-scale buggies I raced with had aluminum clutch shoes that don't slip, but the S3's shoes are made of a composite that I thought for sure would make the car sluggish off the line because of a little slipping; but I never saw signs of the clutch slipping when I mashed the gas. The clutch

mini test

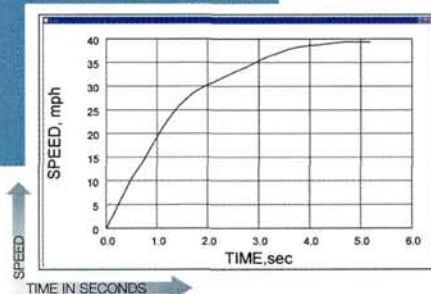
Collari LC21B3 .21 engine

Collari engines are among the best in the world; in fact, current IFMAR 1/8-scale off-road champ Guillaume Vray used Collari power to earn his big win. The LC21B3 that I chose for the S3 has amazing power and is very reliable. It adapted well to needle changes and ran consistently throughout my day of tests. It had plenty of power to easily push the EB-4 S3 to more than 40mph. It has ABC construction, and the air/fuel mixture is sucked into the 3-port sleeve through a 3-needle composite carb.

Performance will vary with gearing, vehicle, fuel and test conditions.



RAJAR TESTING



Distance (in feet) traveled in:	0-132 ft. time	Speed at 132 ft.
1 SEC. >	15.2	35.6 SEC.
2 SEC. >	53.6	37.77 MPH
3 SEC. >	101.8	
4 SEC. >	156.7	
5 SEC. >	214.1	
	Time to top speed	Top speed
	4.77 SEC.	39.43 MPH

SPECIFICATIONS

MANUFACTURER Thunder Tiger

MODEL EB-4 S3

SCALE 1/8

PRICE \$499

Varies with dealer

DIMENSIONS

Wheelbase 12.6 to 13 in.
(320 to 330mm)

Width (F/R) 11.6 to 12 in./11.8 in.
(295 to 305/300mm)

WEIGHT

Total, as tested 124 oz. (3,511g)

CHASSIS

Type Delta box

Material Extruded-aluminum

DRIVETRAIN

Type Full-time 4WD, shaft-driven

Primary 13T clutch bell/46T spur gear

Transmission ratio 3.31:1

Final drive ratio 11.72:1

Drive shafts (F/R) Rebuildable universals

Differentials Silicone-filled bevel gear, etc.

Bearing type Rubber-sealed ball bearing

SUSPENSION

Type (F/R) Pivot ball/A-arm w/upper link

Shocks Aluminum body with dual-stage pistons

WHEELS

Type 5-spoke

TIRES

Not included

ELECTRONICS

Not included

ENGINE AND ACCESSORIES

Engine Not included

Manifold Not included

Pipe Not included

Fuel tank 125cc, dual pick-up



Tires are not included, but the stylish 5-spoke rims are.

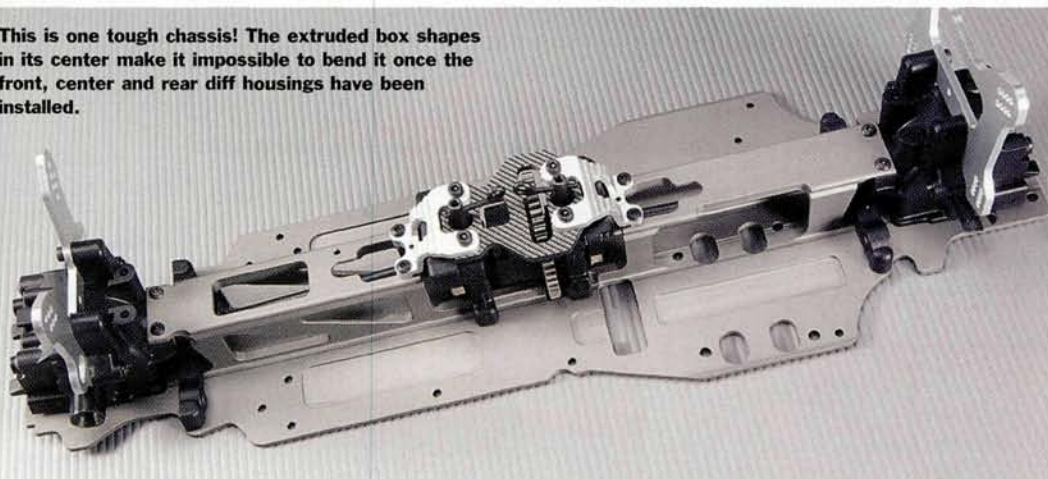
The fuel tank has a dual pick-up so the car doesn't run out of fuel when the buggy is upside-down.

FACTORY OPTIONS

- Aluminum servo-saver set—item no. PD1857
- Lightweight steering plate—PD1858
- Steel spur gear, 48T—PD1998
- Aluminum center diff mount—PD1845
- Swaybars (gold/silver)—PD1866/PD1867
- Machined-aluminum front shock tower—PD1840
- Machined-aluminum rear shock tower—PD1841
- Lightweight engine mount—PD1859

Partial list, additional options available

This is one tough chassis! The extruded box shapes in its center make it impossible to bend it once the front, center and rear diff housings have been installed.



bell spins the center diff through a 46-tooth steel spur gear. The diff is a sealed, 6-gear unit that can be tuned by using silicone fluids of different weights (not included). The center diff is held by two, two-piece center diff mounts that make removing the diff much easier than with a one-piece mount.

When it comes to putting down fast lap times with a car of this size and speed, slowing down is very important. The S3 uses two thick composite fiber disc brakes for the job. Front and rear brake bias is adjustable by twisting collars on the linkages, but the collars are hard to grip, so it's better just to move the outside collars in or out to set up the brakes. Steel universals spin the front and rear gear diffs. Just like the center diff, the front and rear diffs are 6-gear sealed units turned by a spiral-cut, steel, ring and pinion gear. All the S3's driveshafts are rebuildable, universal-joint units, and all the drivetrain components ride on rubber-sealed ball bearings.

ENGINE AND ACCESSORIES. TTR doesn't include an engine or a tuned pipe, but it does throw in a dual-element air filter that keeps dirt out of the carb. Small, molded fuel clips are supplied to keep your pressure and fuel lines neatly in place on the chassis. The fuel tank is one trick piece. It has a dual pick-up with a check valve so that the carb will still be fed fuel even if the car is upside-down. This is great for when track marshals are particularly slow. The fuel nipple is at the front of the tank, and the pick-up is at the rear. The exhaust-pressure nipple is mounted in the tank's lid to reduce fuel foaming. A small lip on the outside of the tank directs spilt fuel down though the chassis. The lip is so small that I wondered how good a job it would do.

SUSPENSION AND STEERING. The S3's front end features a pivot-ball-type suspension. Roll center and front kick-up can be tweaked by changing the molded pivot blocks at the front of the hingepins. Moving small molded clips on each side of the inside of the upper arm changes caster, and three positions are available. Two pivot plates support the front and rear of the upper hingepins while a front plate and a rear block support the lower hingepins. The rear suspension uses a lower H-arm with an adjustable upper link. The lower, inner hingepins are supported at both ends by molded mounts, and the outer mount features pivot balls that reduce stress on the hingepins and inner mount when you alter rear toe and kick-up. Three small clips on the outside hingepins space out the rear hubs; changing them will adjust the car's wheelbase. The aluminum-body, fluid-filled shocks are standouts; see "Variable Damping Comes to RC" for more info.

A small locknut holds the pistons on the shafts, and rubber booties keep the dirt away from them to protect them from being scratched. Dual O-rings keep the oil in and the dirt out, and a molded-plastic cap keeps the O-rings in place. There are 10 shock-mounting holes (8 in the shock tower and 2 in the arm) in the rear, and 8 in the front (6 in the shock tower and 2 in the arms). Front and rear swaybars keep the car flat in the turns.

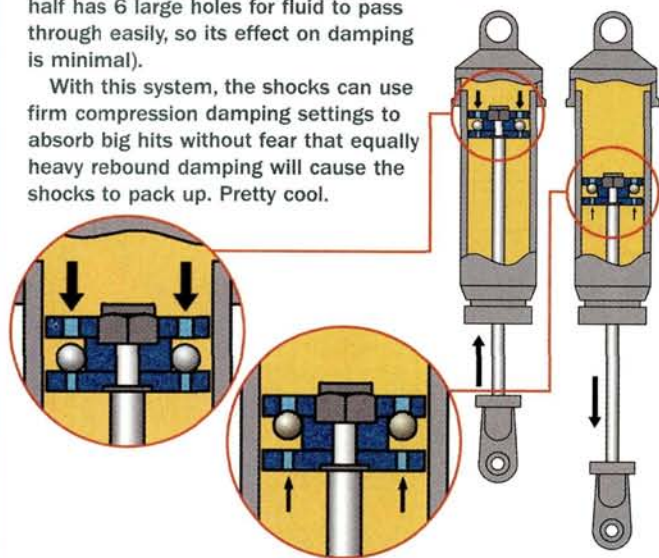
A dual-bellcrank steering system points the front wheels. The

Variable Damping comes to RC

The S3 has a unique, variable-damping system. The secret is the tiny check balls inserted into each of the split shock pistons. As the illustration shows, the balls move up and down relative to the piston halves to automatically vary the number of "open" holes.

There are 4 holes in the lower piston half. When the shock is compressed, 2 of the holes are closed by the check balls, and damping is increased (in effect, you have a 2-hole piston). On the extension stroke, the balls are forced upward and the holes open, so you have the lighter damping of a "4-hole" piston (the upper piston half has 6 large holes for fluid to pass through easily, so its effect on damping is minimal).

With this system, the shocks can use firm compression damping settings to absorb big hits without fear that equally heavy rebound damping will cause the shocks to pack up. Pretty cool.



right bellcrank has an adjustable, built-in servo-saver, and both bellcranks are ball-bearing supported. The drag link has 2 holes on each side so that you can adjust Ackerman, and adjustable turnbuckles make quick work of adjusting toe.

BODY, WHEELS AND TIRES. The S3's, clear-Lexan body has a nice clean look. As the photos show, the top of the body sits very low and exposes much of the cooling head. I sent it over to Bodz for the paint. Hey; why do it when someone else can do it? A set of white, 5-spoke wheels comes in the box. Small lips on the bead sections lock the tires in place once you've applied glue. The choice of tires is left to you; I rounded up a set of Pro-Line Knuckles 2.0s for my ride.

LIKES

- Super-stiff chassis.
- Variable-damping shock pistons.
- Dual pick-up fuel tank.

DISLIKES

- Receiver box is a little tricky to get into.
- Adjusting the brake linkages is difficult.

THE COMPETITION

VEHICLE >> REVIEWED
 Kyosho 777 Special 1 >> 1/05
 Mugen MBX-5 >> 9/03
 OFNA X1 Pro
 XRAY XB8 >> 11/04
 XTM X-Terminator >> 10/04

FIND IT

>>> Go to page 244 for manufacturers' contact information.

YOU'LL NEED

Transmitter and receiver
 Steering and throttle servos
 Receiver pack
 Tires
 .21 engine
 Manifold and tuned pipe
 Starter box
 Glow-plug igniter
 Silicone diff and shock fluid
 Fuel

WE USED

Airtronics M8
 Airtronics 94359Z
 Team Orion Marathon 1400
 Pro-Line Knuckles 2.0
 Collari LC21B3
 O.S. T2050
 Trinity X-5
 Du-Bro E/Z Glow
 GS Racing Silicone
 Team Orion 30% Black Demon



PERFORMANCE

I couldn't wait to get the S3 in the dirt to see how well its innovative features would perform. When I mashed the gas, the tires dug into the dirt and launched the S3 off the line. Clutch engagement was very strong, and I saw no signs of slipping. Even after the engine and clutch had had time to warm up, the clutch still felt solid. The S3 tracked straight whenever I nailed it and never pulled to either side.

When I applied the brakes, they instantly slowed the big buggy without pulsating, but I couldn't enter a turn at high speed without it pushing. I dialed out a little front brake, and the S3 was able to enter turns much faster because the front tires were able to roll slightly and help to direct the front end.

The S3 responded well to power inputs when exiting turns; it needed just a little correction in some turns because the rear end slid out a little. I think a switch to Pro-Line Dirty Harry tires could have solved that, but I didn't have a set in my gear bag. It's all good; having a little less traction actually made for a better test because it showed that the S3 was easy to reel in if it got a little loose.

I really like the suspension on this buggy; it's very smooth and works well. The small bumps in the track didn't upset the car much thanks to the shocks' variable damping. It was as if the tires never left the surface when driving over them. It had all the damping

needed to blast through rough sections without bottoming the shocks, and the quick rebound kept the tires in touch with terra firma.

The S3 is also a blast over jumps. It went high and far with all that Collari power on tap, and it jumped with a slightly nose-up attitude when I stabbed the throttle just before I hit them. Correcting the attitude of the buggy in the air was easy to do thanks to the great brakes and high-horsepower engine. Fun; but landing is important, too. If the buggy doesn't settle fast, it will increase your lap times. The S3 was always planted when it came back to earth.

A full-race machine like the S3 invites you to push harder to find its limits, and crashes are inevitable. Breakage was never an issue, but the occasional tumble was a good opportunity to test the S3's dual-pick-up tank. TTR designed the tank to supply the engine with fuel even when it's upside-down. Whenever I put the S3 onto its lid, I took my time walking to it to flip it over. I just revved the engine before I put it on the track, and it ran well. There was a constant supply of fuel, even when transitioning from upside-down to right-side-up. That's convenient during practice and can be a race-saver in competition.



THE VERDICT

When I saw the first photos of the S3 prototype, I knew it would be sweet buggy, but after building and testing it, I'm blown away. Could it be anymore adjustable? It's nice to see a company thinking outside the box; the chassis, shock pistons and fuel tank

are too cool. Even the instructions are excellent: they tell you what the setup options are and explain what each setup change does. Nice buggy, TTR! ■

RATINGS

Instructions	●●●●●●●●●●	9	The drawings are great and easy to figure out. The clutch section, however, is a little tricky.
Parts fit & finish	●●●●●●●●●●	9	Two of the parts had to be massaged to get them to fit properly. That's the only problem I had.
Acceleration	●●●●●●●●●●	9.5	The buggy puts the power to the ground well; can't say I felt any clutch slipping.
Turn-in	●●●●●●●●●●	10	The S3 turns in aggressively yet with precise control. It's as good as it gets.
Corner speed	●●●●●●●●●●	9	The rear end slid out a little when exiting turns.
On-power steering	●●●●●●●●●●	9	Just a slight push in the front end when on power.
Bump handling	●●●●●●●●●●	10	The dual-stage pistons really work and make the S3 a bump-eating machine.
Jumping	●●●●●●●●●●	10	I felt confident controlling the buggy in the air, and landings were totally controlled.

Best buyer>>> Buggy racers, anyone who likes to wheel top-of-the-line equipment

The **Avenger Storm MK II** is **GS Racing's latest entry** in the 1/8-scale buggy world. It has "Storm" in its name, but don't let that fool you; the Avenger is a totally redesigned machine that doesn't share much DNA with the original Storm RTR and Pro buggies. The front suspension is now a pivot-ball type, the diffs are much smaller for improved acceleration, and nearly all of the buggy's other parts have been redesigned. The Avenger may be GS Racing's best buggy yet, but how well do all these changes affect its performance on the track? Time to drive.



GS Racing Avenger Storm MK II



Still called “**Storm**,” but all-new from bumper to wing



KIT FEATURES

CHASSIS. A 3mm gunmetal-gray anodized-aluminum chassis is the Avenger's main platform, and its sides are radiused to provide additional strength. The standard 8 degrees of kick-up have been incorporated into the front end of the chassis. To keep front to rear chassis flex to a minimum, two anodized-aluminum chassis braces are secured to the chassis plate; one connects the front steering brace to the chassis, and the other secures the rear of the chassis to the rear bulkhead. Phillips-head screws hold the entire car together, but hex-head screws would have been a nicer touch.

Three-millimeter carbon fiber is used for the servo tray, center diff brace and front steering brace. The servo tray is fastened in three spots to the chassis and with two screws to the radio box; this contributes to making the Avenger stiff and rigid. Narrow plastic mudguards are mounted on the sides of the chassis to keep dirt out. The underside of the Avenger's chassis doesn't seem as cluttered as other 1/8-scale buggies' that have dozens of screws; it's actually really easy to remove sections of this buggy. There are cutouts in the chassis for the front and rear diffs so that they can sit low as possible to get the CG lower. "Ears" on the outside front and rear portions of the chassis are used as suspension-arm stops for setting droop.

DRIVETRAIN. Two drivetrain features jumped out at me. The smaller-than-average diffs take only roughly half as much silicone fluid as most other 1/8-scale diffs. The small diffs are a 6-gear, bevel type that uses smaller hardware to reduce size and rotating mass and improve acceleration. The other feature is the use of gigantic 24x15x5mm metal-shielded bearings that sit in the front knuckles and rear hubs.

Other key features are the buggy's front, CV-type driveshafts and the center and rear dogbones. The entire buggy's outdrives are hardened black steel. A competition buggy should come outfitted with CV-type driveshafts in the center and rear, in my opinion. The center diff holds a hardened-steel 44-tooth spur gear that's paired with a 13-tooth clutch bell that is included. I opted for a 14-tooth clutch bell, since GS Racing's Garen Hagobian recommended it for the larger supercross-style tracks we have here in Southern Cali. The entire drivetrain rotates with ease on metal-shielded ball bearings. The Avenger is brought to a halt by its standard, vented-steel rotors that are pinched by padded-steel calipers. The throttle and brake linkages come with the kit but must be installed and set correctly.

test engine Werks Racing P7-R

The P7-R has been given excellent marks from SoCal pro drivers who have tested prototype versions of it. They said that it has tons of power and plenty of bottom end. Well, you can believe the hype because the P7-R is a strong, reliable mill that surpassed even my lofty expectations. I geared the Avenger with a 14-tooth clutch bell, as recommended by GS's Garen Hagobian, and it was an excellent match for the buggy and powerplant.



BUILDING AND SETUP TIPS

The Avenger's large CAD illustrations and text are pretty straightforward. There are only a few places throughout the build that might trip builders up, especially inexperienced ones who haven't yet built a buggy. Here are some suggestions I jotted down while I was building.

DIFF ASSEMBLIES. Put a little thread-lock on the setscrews that plug the diff cases. This will prevent the diffs from leaking fluid; that could get messy and would ultimately alter diff action.

REAR HUB-CARRIER ASSEMBLY. Use a shop towel to clean the 5mm setscrews that secure the drive pins. Any oily residue that's left over from the factory will prevent the thread-lock from creating a strong bond.

REAR LOWER ARMS. For additional rear traction and to free the suspension under power, run the hubs all the way back. This will prevent the

from being swept forward too drastically and binding the suspension under power.

FUEL TANK. Run an oversize fuel filter and 6 additional inches of fuel tubing. The fuel filter is extra protection against engine-harming debris, and the additional tubing will give you added run time when the tank is freshly topped off after warmup and before a race.

ENGINE MOUNTING. Use thread-lock on the 4x8mm engine-mount screws so that they won't vibrate loose during operation. Longer screws would be better; if your local hobby shop carries 4x12mm flat-head screws, buy them.

ENGINE AND ACCESSORIES. No engine is provided with the Avenger, but it is ready to accept a .21 big-block for racing and larger engines for those who want to play. The buggy does include finned-aluminum engine mounts, engine-mounting hardware, an aluminum flywheel, pipe hanger and a 3-shoe clutch with carbon shoes. The engine mounts are easily adjusted to accept various makes of engines. The 4x8mm engine-mount screws aren't very long; 10 or even 12mm-long screws would provide extra threads that would help to secure the engine.

A 125cc spring-loaded, flip-top tank with built-in splashguard is included. A new feature for GS tanks is the built-in "fuel moat" that carries spilt fuel away to the underside of the chassis. General Silicones' signature thick-walled fuel tubing is



Just five screws have to be removed to pull out the servo tray for routine chassis cleaning. The oversize radio box routes the servo wires toward the upper outside portion of the box; this is much easier to work with than conventional compartments with small, central holes.

SPECIFICATIONS

MANUFACTURER GS Racing
MODEL Avenger Storm MK II
SCALE 1/8
PRICE \$550
Varies with dealer

DIMENSIONS

Wheelbase 12.8 to 13 in.
 (324 to 329mm)
Width 12.2in. (310mm)

WEIGHT

Total, as tested 127.43 oz.
 (3,612g)

CHASSIS

Type Stamped plate
Material 3mm 6061anodized-aluminum

DRIVETRAIN

Type Shaft-driven, full-time 4WD
Primary 14T clutch bell/44T steel spur
Clutch 3-shoe with carbon shoes
Transmission ratio 3.28:1
Final drive ratio 11.07:1
Drive shafts (F/R) CV-type/dogbones
Differentials Sealed, silicone-filled, 6-gear
Bearing type Metal-shielded

SUSPENSION

Type (F/R) Pivot ball/camber link with lower H-arm
Shocks Aluminum-body, top-filled, silicone bladders, 3.5mm shafts

WHEELS

Type White dish

TIRES

Type Directional knobies

ENGINE & ACCESSORIES

Engine Not included
Pipe Not included
Manifold Not included
Fuel tank 125cc with stone filter

ELECTRONICS

Not Included

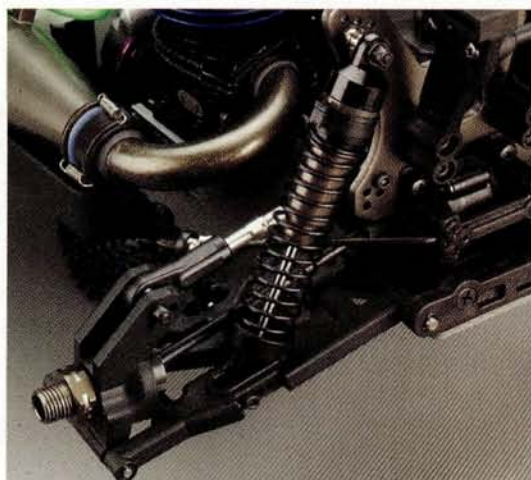


Below: the front end has the usual pivot-ball adjustability for camber and caster. Note the unusual bellcrank configuration.

Below: wheelbase, anti-squat and camber-link location are easily adjusted. I found that running the hubs all the way back positioned the rear driveshafts nearly perpendicular to the chassis, which let the suspension operate more freely under power and increased rear traction.

FACTORY OPTIONS

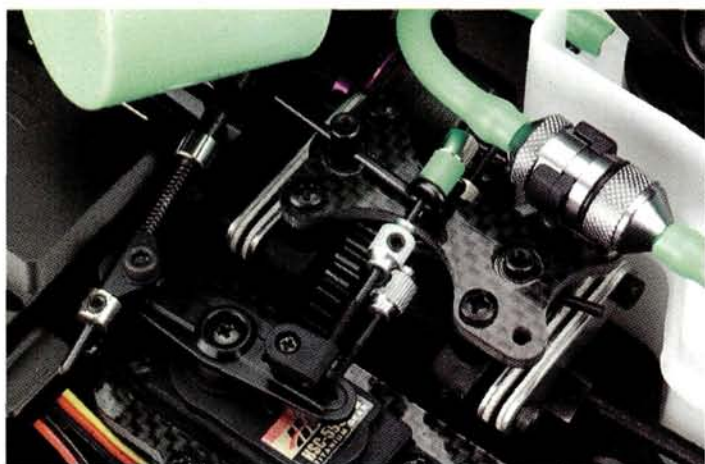
- Aluminum wing posts—item no. GS-AVP028
- Lightened 5mm 7075 aluminum shock tower (F/R)—GS-AVP021/GS-AVP022
- Aluminum swaybar plate—GS-AVP010
- Aluminum rear toe-in suspension mount (3 deg.)—GS-AVP014
- 7075 anodized-aluminum engine mounts—GS-AVP024





included, and there is plenty of it for the fuel lines (for my test, I opted for the neon-green stuff because it looks trick). A large air filter with a green plastic sheath is included with the snorkel attachment to allow the engine to breathe. GS also throws in one of its silicone switch guards to protect the on/off switch from dirt and grime.

SUSPENSION AND STEERING. Pivot-ball suspension is used up front, with the usual adjustability this type of setup provides. Moving the upper arms on their hingepins changes caster, and camber is adjusted by threading the pivot balls in and out of the arms. Clip-on spacers in different thicknesses are provided to



The center diff is easy to get to thanks to the buggy's easily split diff mounts. Unscrew the four screws that secure the carbon-fiber center diff brace, slide the top halves of the mounts over the keyed shafts, and you'll be able to grab the center diff.

space out the pivot balls so that the left and right side camber adjustments can be set perfectly without their need for setup gauges. All pivot-ball cars should have this feature.

Lower H-arms are used in the rear to anchor the shocks and swaybars. A dual-bellcrank steering system is linked by a 4mm, hard-anodized drag link to provide steering, and an adjustable servo-saver is housed in the right side bellcrank (but, as with most 1/8-scale buggies, the adjustment collar is difficult to reach). The steering assembly rotates on ball bearings, while a carbon-fiber steering brace secures the steering bellcranks and keeps the front end rigid.

The Avenger's shocks have volume-compensation bladders and their aluminum bodies are hard-anodized gunmetal gray to match the rest of the car. Heavy-duty 3.5mm shock shafts are standard, and the sturdy 4mm shock towers allow many shock position options. In addition, the front and rear suspension arms each have three shock-mounting holes, so finding the perfect shock angle for your track shouldn't be a problem.

The kit comes with front and rear swaybars that reduce chassis roll and three rear toe-in blocks (1-, 2- and 3-degree). I ran the 3-degree block as recommended in the manual for the most rear traction.

BODY, WHEELS AND TIRES. The Avenger comes with an aggressive-looking clear shell, and a new decal sheet with pairs of decals is included (GS buffs will remember previous decal sheets contained only one decal of each size and color). White dish wheels with directional tires are included, but the tires won't be your first choice at the track. They work for break-in and bashing, but aren't true track tires. I installed Pro-Line Crime Fighters for track testing. The wheels are secured with gunmetal-gray 17mm wheel hubs and nuts that match the rest of the buggy's color theme. An oversize wing is predrilled for easy installation; its mounts allow wing angle to be adjusted to vary downforce.



The fuel tank has a small but effective splashguard that keeps fuel away from the front brakes—unless, of course, your pit guy is a total rookie. A small "tank moat" carries excess fuel to the underside of the chassis.



The stock tires aren't great competition treads, but they're good for break-in and fun-running.

LIKES

- › Fully adjustable and easy to work on.
- › Built tough; no need for hop-ups.
- › Roomy receiver/battery box.

DISLIKES

- › I prefer hex hardware to the included Phillips-head screws.
- › Dogbones are used for the center and rear driveshafts; a pro buggy should include universals.
- › Stock tires aren't good for racing.

THE COMPETITION

OFNA Jammin' X1 Pro
Kyosho 777 Special 1 >> 1/05
Mugen MBX-5 Pro
XTM X-Terminator Pro >> 10/04
Thunder Tiger EB-4 S3 >> 4/05
XRAY XB8 >> 11/04

FIND IT

>>> Go to page 244 for manufacturers' contact information.

YOU'LL NEED

Receiver pack
Fuel
Servos
Engine
Radio

WE USED

Team Orion Marathon 1400
Trinity Monster Horsepower
Hitec HSC-5997 TG titanium gear
Werks/Picco P7-R
Airtronics M8 Backlit



PERFORMANCE

The Werks/Picco P-7R racing engine has a rep for big power, so I was excited to get the buggy on the track. As expected, the piston and sleeve were a really tight fit. Take your time breaking in a P-7R; it takes nearly a gallon of moderately rich breaking in before the piston doesn't stick. I also discovered that the low-speed needle sticks out a few millimeters past the slide valve when set properly (most engine's low-speed needles are closer to flush). With the engine rippin', I made the usual radio-trim and brake-bias tweaks and was ready to hit the track.

My first stop was Hot Rod Hobbies for the photo shoot. The Avenger had tons of steering, which was good, as Hot Rod's tight layout is designed for smaller, 1/40-scale, vehicles. I was happy that the steering system had enough throw to keep the Avenger between the pipes, but there wasn't enough track to really let it open up—especially with P-7R power.

My next stop was Marvin's Hobbies/Sun Valley Raceway. The track was well prepped and loamy. Bumpy sections didn't seem to bother the Avenger much on the straights, but mid-corner bumps occasionally caused the buggy to step out. The Avenger handled jumps as well as any other competition buggy. Takeoffs were flat, and midair attitude control was predictable.

In the soft loam, the Avenger again had plenty of steering, but the back end felt loose. The stock setup has 3 degrees of anti-squat; I switched to 1 degree so that more weight would be transferred to the rear wheels under acceleration. I immediately felt a difference: the rear end wasn't as washy in the sweepers. Having less anti-squat also reduced on-power steering and made the buggy easier to drive.

Along with plenty of steering, strong brakes are key to quick lap times in 1/8-scale off-road. The Avenger's discs faded slightly after a few tanks of continuous running, but after I readjusted them, the brakes were consistently strong and gave a good feel at the trigger.

As I put in more laps, the engine made more power, and this really tested the Avenger. On the long straightaway, it felt sketchy at top



speed, and it was sensitive to steering input. I ran zero toe; a little toe-in would have helped, but I didn't want to lose the precise low-speed handling. It wasn't exactly planted, but it was better than it had been. There's always more tuning time, and the buggy reacted predictably to my setup changes. With more time to find the best setup, I could easily be competitive with the Avenger.

THE VERDICT

GS Racing's Avenger Storm is a solid ride that is as capable as the racer who pilots it around the track. It's a tough buggy that won't see much time on the bench for repairs, and all the major tuning elements such as anti-squat, front caster, wheel-base, rear camber-link location and shock positions are easy to

adjust. And parts support isn't an issue; if your local shop isn't down with GS, all replacement parts can be bought easily online at GSRacing.com. If you like lots of steering (who doesn't?), and the idea of running something other than the usual suspects turns you on, this could be the buggy for you. ■

RATINGS

Instructions	●●●●●●●●●●	☐	Generally good but a little vague in places; the exploded-view CAD drawings are a nice touch.
Parts fit & finish	●●●●●●●●●●	☐.5	The anodized and carbon-fiber pieces aren't as well finished as they could be.
Turn-in	●●●●●●●●●●	☐	Steering feel is very aggressive, but somewhat sensitive.
Corner speed	●●●●●●●●●●	☐.5	Not great out of the box, but can be improved with tuning.
On-power steering	●●●●●●●●●●	☐	Oversteered a bit, and that caused it to fishtail at times.
Braking	●●●●●●●●●●	☐	The dual vented-steel discs and padded calipers did their jobs well.
Bump handling	●●●●●●●●●●	☐	Mostly well planted, but mid-corner bumps occasionally tripped up the Avenger.
Jumping	●●●●●●●●●●	☐	This buggy jumps well, and landings are generally worry-free.

Best buyer >>> All nitro buggy racers

Head *2* Head

T4 RTR VS. XT RTR

Ready to Rumble!

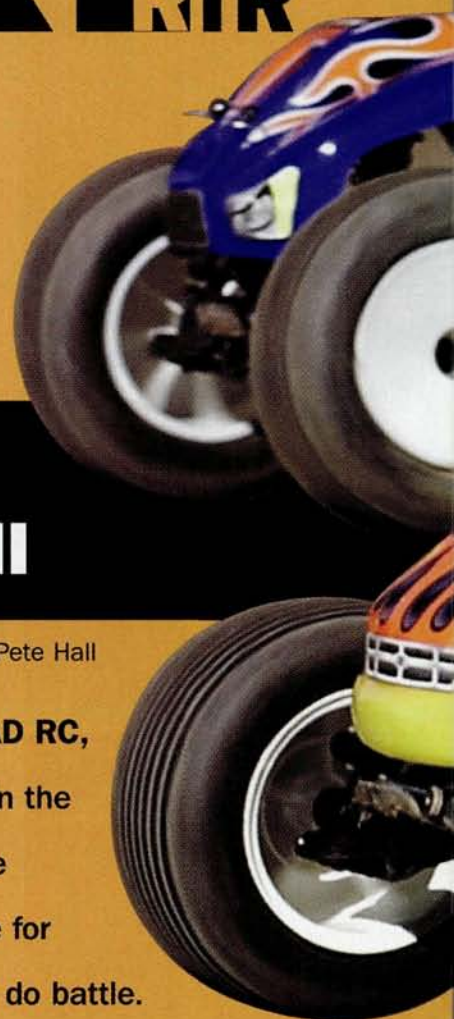
Associated **T4 RTR Plus SE** vs. Team Losi **Triple-XT Sport II**

by the RC Car Action team

photos by Jason Sams & Pete Hall

ASSOCIATED VERSUS LOSI: IT'S THE CLASSIC BATTLE OF OFF-ROAD RC, and we've had a lot of fun pitting the two brands against each other. In the October '04 issue, we put Associated's Factory Team T4 up against the Team Losi Triple-XT Matt Francis Edition 2, and Losi won. Now it's time for the latest RTR versions of Associated's and Losi's trademark trucks to do battle.

The T4 Ready to Run Plus SE is newly upgraded with a Reedy 15-turn motor and an LRP A.I. Super Reverse speed control. Meanwhile, Losi has upgraded its popular Triple-XT Sport with chrome wheels, a Fury body, Trinity 19-turn power and a Novak-built speed control. It's gonna be close!





ASSOCIATED T4 RTR Plus SE



Left: LRP's A.I. speed control automatically sets itself up to match the transmitter—no button-pushing required.



Right: the T4's dual-pad slipper spares the transmission from abuse. The tranny is standard T4 racing stuff—3-gear with a ball differential.



Quick Specs

Price: \$250

Not included: 6-cell battery pack, battery charger and 8 AAs for the radio

Radio: Airtronics Blazer Sport

Speed control: LRP A.I. Super Reverse

Steering servo: Airtronics 94102

Motor: Reedy Power 15-turn

Top speed: 22.5mph



Hot Spots

1. LRP A.I. reversing speed control with automatic setup
2. Airtronics 94102 servo (claimed torque: 50 oz.-in.)
3. Reedy Power 15-turn motor
4. Rubber-sealed ball bearings throughout
5. 3-gear, 2.6:1 transmission with ball differential
6. Dual-pad slipper clutch
7. Blue-anodized aluminum shocks
8. Low-profile Associated Bow-Tie-style tires on white dish wheels, factory-glued
9. Steel turnbuckles
10. Factory-painted body

BONUS

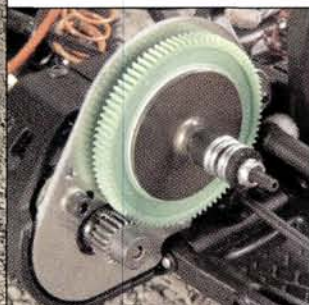
- Reliable, long-range Airtronics radio system with dual-rate.
- LRP A.I. speed control never needs setting.
- Reedy 15-turn motor outruns typical 19- and 20-turn RTR motors.

BOGUS

- Radio is reliable, but that's all. It's light on tuning features.
- Plastic-gear "standard" servo is merely adequate



TEAM LOSI Triple-XT Sport II



Left: the Triple-XT also uses a dual-pad slipper clutch and 3-gear transmission with ball differential.

Right: Novak builds the Losi Sport speed control for Team Losi; it looks like a relabeled XRS. It's a good speed control.



Quick Specs

Price: \$270

Not included: 6-cell battery pack, battery charger and 8 AAs for the radio

Radio: JR Racing XR2i

Speed control: Team Losi Sport by Novak

Steering servo: JR Racing Z-590

Motor: Trinity Nervous Breakdown 19-turn

Top speed: 19.9mph

BONUS

- Excellent radio system features LCD screen, steering endpoints, 2-model memory.
- High-quality, Novak-built Losi Sport speed control.
- High-torque servo is well suited to truck use.

BOGUS

- Chrome is usually cool, but we don't dig it on dish wheels.
- Assembly-line guys goofed up the motor wiring.

Hot Spots

1. Team Losi Sport reversing speed control by Novak
2. JR Racing Z590M servo (claimed torque: 85 oz.-in.)
3. Trinity Nervous Breakdown 19-turn motor
4. Shielded ball bearings throughout
5. 3-gear, 2.43:1 transmission with externally adjustable ball differential
6. Dual-pad slipper clutch
7. Hard-anodized aluminum shocks
8. Tall-profile Reptile-style tires on chrome dish wheels
9. Steel turnbuckles
10. Factory-painted body

Specs

ASSOCIATED T4 RTR Plus SE

WHEELBASE	11.3 in. (287.5mm)
WEIGHT	63.1 oz. (1,789g)
WIDTH	13 in. (330mm)
CHASSIS	Molded semi-tub
SHOCKS	Blue-anodized aluminum
CAMBER LINKS	Steel turnbuckle
BALL BEARINGS	Rubber-shielded
DRIVETRAIN	3-gear transmission w/ball diff
DRIVE AXLES	Steel dogbone
TRANSMISSION RATIO	2.6:1
FINAL DRIVE RATIO	11.31:1
WHEELS	One-piece white dish
TIRES (F/R)	Ribbed/pin-spike
STEERING SERVO	Airtronics 94102
CLAIMED SERVO TORQUE	50 oz.-in.
SPEED CONTROL/MOTOR LIMIT	LRP A.I. Super Reverse/15T
MOTOR	Reedy Power 15T
PRICE	\$225

Test Gear

Trinity P2k2 Stock motors.

Although both trucks have speed controls that can handle mod motors down to 15 turns, we installed competition stock motors for testing. Our thinking was that if you're going to race an RTR, the stock class will be your first stop. And if you're gonna race stock, a P2k2 is a great choice; it's the choice of many fast SoCal locals.



Team Losi 8-Rib front tires. Again, with the local fast setup as our guide, we went with Losi's 8-Rib design in red compound. Losi was the first to use low-profile ribs, and they hook up.



Tech Notes

■ The RTR T4 follows the standard T4 race kit's specs very closely. With the exception of dogbone driveshafts in place of MIP CVDs, blue-anodized shock bodies instead of hard-anodized and Associated rubber instead of Pro-Line, the factory-built T4 is identical to the you-build-it model.

■ Associated molds some of its other RTRs' parts overseas, but not the T4's. Although it isn't assembled in the U.S., the RTR T4 does use the same made-in-the-USA parts.

■ We're happy to see any type of ball bearings in RTRs, but Associated stepped up and spec'd rubber-sealed bearings. RTR guys aren't usually big on maintenance, and rubber-sealed bearings are as maintenance-free as bearings get.

■ Hold your horses! Before you start tearing up your track or backyard with the T4, install the safety tape on the LRP A.I. speed control's case as the instructions suggest. This is experience talking; we skipped this step, and the speed control's case popped open.

Transmitter

MODEL	Airtronics Blazer
CHANNELS	2
MODULATION	AM
MODEL MEMORY	None
LCD SCREEN	No
STEERING DUAL-RATE	Yes (analog)
STEERING ENDPOINTS	No
THROTTLE ENDPOINTS	No
SUB-TRIM	No
LOW-BATTERY ALARM	No
COST IF PURCHASED SEPARATELY	\$70



The Blazer Sport radio is light on features, but it does have dual-rate steering and a strong signal.



Tech Notes

■ The Sport II has the most racing features of the two trucks by virtue of its universal-joint driveshafts and hard-anodized shock bodies. And it handily wins the "Best Electronics" prize because it includes a JR Racing XR2i computer radio and a heavy-duty Z590M servo with metal gears and 85 oz.-in. of torque.

■ The Sport II is fully compatible with all Triple-XT series parts, but it uses a more flexible plastic formula to give them increased impact-resistance (bashers, we're talking to you).

■ Double-check the motor wiring; our Sport II's bullet connectors were slipped onto the wrong motor lugs at the factory. Fixing it was a no-brainer for us, but it could have been a real puzzle for a true beginner.

■ The Sport II's ball differential can be adjusted externally without disassembly; we like that. Adjusting the T4's diff requires you to pop off a camber link and pull the dogbone out of the outdrive.



Transmitter

MODEL	JR Racing XR2i
CHANNELS	2
MODULATION	AM
MODEL MEMORY	2
LCD SCREEN	Yes
STEERING DUAL-RATE	Yes (digital)
STEERING ENDPOINTS	Yes
THROTTLE ENDPOINTS	Yes
SUB-TRIM	Yes
LOW-BATTERY ALARM	Yes
COST IF PURCHASED SEPARATELY	\$120

Here's the dealmaker: JR Racing's XR2i radio. It's got a ton of tuning features, including steering endpoints, digital trims, assignable grip buttons and 2-model memory.



Specs

TEAM LOSI Triple-XT Sport II

WHEELBASE	11.4 in. (290mm)
WEIGHT	64.3 oz. (1,822g)
WIDTH	13 in. (329mm)
CHASSIS	Molded semi-tub
SHOCKS	Hard-anodized aluminum
CAMBER LINKS	Steel turnbuckle
BALL BEARINGS	Metal-shielded
DRIVETRAIN	3-gear transmission w/ball diff
DRIVE AXLES	Steel universal joint
TRANSMISSION RATIO	2.43:1
FINAL DRIVE RATIO	10.692:1
WHEELS	One-piece chrome dish
TIRES (F/R)	Losi ribbed/pin-spike
STEERING SERVO	JR Racing Z-590M
CLAIMED SERVO TORQUE	85 oz.-in.
SPEED CONTROL/MOTOR LIMIT	Losi Sport by Novak/15T
MOTOR	Trinity Nervous Breakdown 19T
PRICE	\$270

Test Gear

Epic Dreadnaught 3000 packs. These packs are sold in pairs for the Traxxas E-Maxx, Kyosho Twin Force and other dual-battery apps, but they're also a great choice



for anyone who wants high-capacity low-price power. Two 3000mAh stick packs for less than \$50? That's a steal.

Pro-Line M3 Holeshoot rear tires. Our tire-selection process was simple: run whatever works at SoCal Raceway. Holeshoots in the M3 compound are the fast setup for the soft, damp clay track, and nearly all the pros who practice there run Holeshoots.



RACE PLACE SoCal Raceway

SoCal Raceway is home to many pro drivers and fast Southern Cali locals. The track's layout is usually jump-filled supercross-style.

The layout we ran the trucks on had several large doubles that require good corner speed to clear them. There was also a rhythm section, tight turns and plenty of bumps. It was an excellent proving ground for both trucks in their out-of-box trim. We actually ran alongside several other drivers who had T4 RTR and Triple-XT RTRs who were getting a feel for track action as well.



Track Test

It's true: most RC racing vehicles never make it to a racetrack, and the percentage that does is probably even slimmer for RTRs than it is for kits. Nonetheless, we think track testing is important. These are racing trucks, and we do hope that many of you are eyeballing them as your start in racing. We tested the trucks bone-stock and also ran them with identical motors, tires and gearing to simulate how they'll fare if you do decide to start racing (in which case, you'll almost certainly trade up to a competition stock motor and whichever treads are popular where you race). Drivers, on the tone

Stock Test >>> Stock tires and motors

	T4 RTR PLUS SE		XT SPORT II	
	BEST LAP	AVG. LAP	BEST LAP	AVG. LAP
Jason Sams	24.45	25.12	25.52	26.15
Nick Sava	24.53	24.86	25.26	26.09
George Gonzalez	25.49	26.32	26.55	27.44
Derek McDonald	25.63	26.17	26.76	27.34

Modified Test >>> Team Losi 8-Rib and Pro-Line Holeshots tires and Team Trinity P2k2 motor

	T4 RTR PLUS SE		XT SPORT II	
	BEST LAP	AVG. LAP	BEST LAP	AVG. LAP
Jason Sams	23.72	24.14	23.94	24.34
Nick Sava	23.67	24.11	24.21	24.39
George Gonzalez	24.93	25.58	25.45	26.14
Derek McDonald	25.21	25.76	25.88	26.24

Play Time!

T4 RTR Plus SE

The T4 RTR Plus SE's suspension is pretty stiff in stock trim, which is great for big jump landings, but that gives the T4 a bumpier ride than the more softly sprung Losi. Rough terrain also makes it tougher for the T4



to find traction, as its rear tires have a relatively low profile. That means the truck rides lower, and there's less sidewall to deform over obstacles and find grip. That's assuming you slow down, but if you favor the flat-out, go-fast-and-let-momentum-do-the-rest-approach, the T4 will go up and over just about anything any other stadium

truck can handle. We found ourselves holding back from this sort of abuse, however, because the T4's suspension arms and shock towers feel noticeably stiffer than the Triple-XT's. Stiffness is a virtue on the race-track, but for bashing around, flexibility equals durability. It's better to have parts that bend and then spring back rather than snap. We didn't actually break anything in testing, but it's something to consider if your vision of RC fun includes skateboard ramps and street driving.

Triple-XT Sport II

The Triple-XT Sport II really shines when it hits grass, rocks and other rough stuff. The truck's soft suspension soaks up everything short of monster truck terrain, and its gnarlier, taller rear tires are at home in basher-type conditions. The truck absorbed some very hard hits. We were actually laughing when we found out nothing had broken after some end-over-end tumbles that looked like outtakes from the sprint-



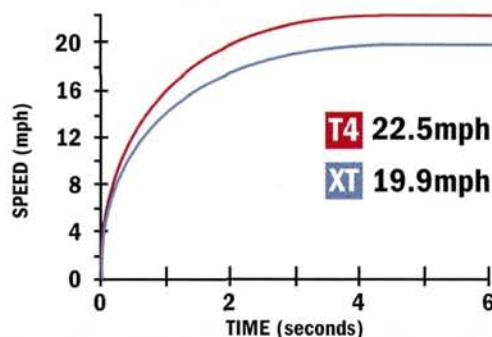
car segment of a crash video. "... and they walked away!"

The XT's more flexible parts really showed they could take abuse, and that convinced us that it's definitely the better truck to hand over when your novice friends come over to play. The precise steering

makes it easy to line up for jumps. We also liked the speed control's double-pump reverse mode that makes it impossible to grab reverse by accident.

Radar Testing

Radar testing was done only with the trucks' stock equipment. The T4 and its 15-turn powerplant outran the Triple-XT with 19-turn power. It's all about motor, and the T4 simply has more. The top speeds were close (22.5 and 19.9mph respectively), but track feel was a different story. The difference in acceleration represents a significant punch advantage for the T4 that showed up in the lap times. As for play driving, the Losi has plenty of scoot, but you will have to give it up to the guy with a T4 when it's time for the inevitable parking-lot drag race.



Driver's Picks

Jason Sams

Team Associated T4 RTR Plus SE

The T4's stiffer than a normal RTR's suspension was great for sky-ing off big jumps, but if I raced this truck, I would change it to be softer. The included 15-turn motor is pretty fast, and all the components are good.



Team Losi Triple-XT Sport RTR II

Losi's Triple-XT Sport II comes with great electronics, but its motor doesn't rip. It's tough, however, and bashers will appreciate the flexibility of the parts. The truck steered very well, and the suspension felt good on the track, but the XT Sport was slightly slower.

Winner: T4 RTR Plus SE

The T4 RTR Plus SE was faster, and I also like its stiff suspension components because I'm a racer at heart and want stiff stuff. The 15-turn motor is surprisingly quick, and the tires worked fairly well on the test track.

Derek McDonald

Team Associated T4 RTR Plus SE

Out of the box, I'm very impressed with this RTR. The T4 was fast with the stock gearing and motor. The truck had good steering and jumping characteristics without any adjustments.



Team Losi Triple-XT Sport RTR II

The Losi Triple-XT Sport II had very flexible shock towers and suspension arms. It handled and jumped well, but it was slower than the T4.

Winner: T4 Plus SE

My truck of choice is the T4, especially if you are planning on getting into racing. My lap times also back up my impressions, as I was faster with this truck.

George Gonzalez

Team Associated T4 RTR Plus SE

The T4 RTR was noticeably faster out of the box, and this gave it a huge advantage on the track. However, its relatively stiff suspension made it a little unstable when going through the whoops and bumps.



Team Losi Triple-XT Sport RTR II

The Triple-XT Sport II's suspension is set up a little softer than the T4 RTR's, and this allows the truck to cruise through the rough stuff. The JR high-torque, metal-gear servo also gave the truck an edge in the steering department. It allows the Sport II to carve tighter lines around the track.

Winner: Triple-XT Sport II

Both trucks are competent handlers, and both make great backyard bashers, but you get a better radio system and steering servo with the Losi. I'm going with the XT on this one. It costs a little more, but you get more for your money with the Triple-XT Sport II.

Nick Sava

Team Associated T4 RTR Plus SE

The T4 felt fairly competitive right out of the box. The stock tires hooked up pretty well, and the included motor had decent power. The one thing I did change was the throttle trim to get rid of some of the deadband. The T4 pushed slightly more than the Losi truck, but a tire change or suspension adjustment could easily fix that.



Team Losi Triple-XT Sport RTR II

The Triple-XT II handled really well out of the box, but the power was not up to par with the T4. The Losi truck landed smoothly over the jumps, and it carries a lot of speed in the corners. If the power issue was fixed, then this would be one dialed and competitive truck.

Winner: T4 RTR Plus SE

Both trucks felt planted, but the T4 would be easiest to win with out of the box. Both work great for playing, but to go from box to track, the T4 Plus RTR SE is the right one for me.

Drivers' Ratings

Here's an idea we stole from *Road & Track*: weighted scoring. We figured value and fun-factor are most important for RTRs, so those ratings have the highest point values, while other criteria have fewer potential points. The top-rated truck in each category gets the full point value, the second-place truck's points are adjusted to reflect relative performance. Scores were supplied by all the drivers and averaged.

	T4 RTR Plus SE	Triple-XT Sport II
Fun factor (40)	40	40
Raceability (30)	30	30
Durability (30)	30	30
Acceleration/speed (20)	20	15
Electronics (20)	18	20
Value (40)	35	40
TOTAL (180)	173	175
Total driver points	697	679

Making the Call

FIND IT

>>> Go to page 244 for manufacturers' contact information.

Hmmm, this is a tough one. It would be easy if these were pure racing trucks—the truck with the fastest lap times for the majority of the drivers is your winner. But it's a different story with RTRs. Is track performance most important? Or is it the elusive "fun factor"? Or value? After all, the typical beginner is probably not looking to race, but is trying to save money—right? But who knows what a typical beginner looks like?

If you go by pure scoring, the T4 comes out ahead: 697 to 679. And all the guys went faster on the track with the T4, so if you're planning to race, the T4 seems like a slam-dunk. But for \$45 more than the T4, the Triple-XT gives you a much more race-friendly transmitter, more efficient universal-joint axles and a more powerful steering servo. After you tune the Triple-XT to your track and add the cor-

rect tires and motor for your class, the T4 will lose its advantage, and you'll have a better-equipped truck. See? Not so easy to pick, is it?

What if you don't want to race at all? Everybody likes features, so the Triple-XT's racin' stuff is still attractive, but it also has the extra plus of crash-forgiving flexibility in its plastic parts (but that makes it not as good for racing, if you want to go back to the race argument). And as nice as the Triple-XT's radio gear is, 45 bucks is 45 bucks, and you don't need the high-zoot stuff if all you wanna do is play.

Basically, we're looking at a draw here. There simply isn't a hands-down winner. But we think there's plenty of info here to help you easily make the right call for yourself, and that's why we do these head-to-heads in the first place. Still not sure which one to pick? This will help:

IF YOU...	GET THE ...	BECAUSE ...
Want to have the fastest truck out of the box	T4 RTR Plus SE	It's faster.
Want the most value	Triple-XT Sport II	For a little more money, you get a lot better radio and servo.
Want to race and don't mind upgrading	T4 RTR Plus SE	Its stiffer parts ultimately make it the better racer.
Want the toughest truck	Triple-XT Sport II	We didn't break either truck, but the XT's flexier parts should be able to shrug off bigger hits. ■

Spektrum DSM

THE LITTLE GRAY BOX THAT WILL CHANGE RC FOREVER

THERE HAVE BEEN QUITE A FEW defining moments throughout the history of RC, but the impact of any product or technology isn't always immediately apparent. Vehicles such as the original RC10 and the T-Maxx didn't achieve cult status until some time after their introduction. Electronic speed controls (ESCs), Ni-Cd batteries, peak-chargers, RTRs and dozens of other developments had been around for years before everyone realized that each represented a pivotal moment in the advancement of RC. We don't need the benefit of history to tell us that the introduction of the new Spektrum DSM system will profoundly change the future of RC.

The days of buying and changing crystals, waiting for a frequency clip during practice, random interference and almost all the other shortcomings of current radio technology, will be history. The new Spektrum system also promises to usher in technology that has never been available in a radio system. There's a lot to look forward to; you just have to open your eyes and watch it unfold.



The Spektrum DSM replaces your existing transmitter module and receiver, and plugging it into your radio advances it light-years ahead of current technology. Current systems in the U.S. operate on 27 and 75MHz; the Spektrum DSM operates on the ultrahigh 2.4GHz band (2400MHz), and there are 79 channels available. RC cars now have 79 channels on a band that is inherently more stable and universally accepted throughout the world. If this article stopped right here, that alone would be huge news. You could stop reading right now and know that running and racing RC cars just became exponentially better. But the aforementioned barely scratches the surface of this new system's benefits. We've tested this new system and talked extensively with the experts who developed it to give you the complete scoop on this fantastic new technology.

DECIPHERING DSSS AND FHSS

The FCC requires that any device that operates on the 2.4GHz spectrum is required to have some type of "collision avoidance" technology, which is a fancy way of saying that it absolutely can't interfere with other devices operating on the same frequency. It's technology that's never been available in the RC car market, but now it's the basis of what makes the Spektrum such a significant leap in technology. There are two standards of this so-called collision avoidance, each with a different approach to guaranteeing reliable operation. Although it's a little techy, it helps to understand the differences between the two methods that provide incredible signal stability and security against interference—so here's the scoop on "FHSS" and "DSSS."

FREQUENCY-HOPPING SPREAD SPECTRUM (FHSS).

The FHSS standard means that the radio system rapidly jumps from one channel to another using a random sequence of channels. Here's how it works: a code at the end of every string of data sent from the transmitter to the receiver tells the receiver the next channel in the sequence. For example, the transmitter might "tell" the receiver, "left, left, left, left, switch to channel 51." The signal jumps randomly from channel to channel hundreds of times per second. Other systems using this standard use different random sequences, and although there's a remote possibility of crossing channels, the resulting interference would last only milliseconds, so you wouldn't be able to detect it.

According to Spektrum's designers, there are two significant elements of the current FHSS standard that make it less than ideal for RC applications. First, the latency time (response time) with the FHSS standard is typically about 50 milliseconds. For reference, the Airtronics M8 out of the box has a response time of about 12 milliseconds, and the ultra-fast Futaba HRS system clocks in at about 8 milliseconds. The fastest FHSS-based systems the Spektrum crew tested had response times of about 25 milliseconds, which is more than twice the response time of a standard M8. The second drawback is the system's response to interference. In the event of signal interruption, it can take 2 to 4 seconds for the transmitter and receiver to resynchronize. The inability to control a moving vehicle for up to 4 seconds would obviously be unacceptable.

■ **DIRECT SEQUENCING SPREAD SPECTRUM (DSSS).** This is the system used by Spektrum. The DSSS standard is unique in that it hunts for and locks into a single channel; there isn't any channel-hopping. When the transmitter is turned on, the module scans and locks on to any channel that is not in use. Because of the 2.4GHz spectrum's collision avoidance requirements, locking into one channel requires different anti-interference measures than those implemented in FHSS systems. A DSSS-based system spreads the RC data over a wide bandwidth using a pseudo-random noise code. The receiver knows its transmitter's spreading code and can distinguish its intended radio signal. Spreading has the additional benefit of digitally increasing the range of the system for the same power. A further security method particular to the DSM is the use of a globally unique identifier code (GUID). This code is encoded into every RC data packet. The GUID is one of 4.2 billion potential codes; there aren't even 7 billion people on the planet.

STEPPIN' OUT

Any radio system that processes signals digitally has a defined number of steps (servo positions) throughout its range of travel. The 1024 standard was made popular by Futaba's PCM radios, they have 1024 steps across the range of control movement. For example, if a servo

The Spektrum DSM system costs about \$160 and consists of a transmitter module and receiver. Extra receivers can be programmed to work with the same module and are available for \$80 each.



MANUFACTURER'S SPECIFICATIONS

DSM SYSTEM

- › Frequency band: 2.400 to 2.4835GHz
- › Channels: 79
- › Channel spacing: 1MHz
- › Bit rate: 15.626kbps
- › Range: 3,000 ft.
- › Latency (response time): 5.6ms
- › Resolution/channel: 4,096 steps

DSM TRANSCEIVER

- › Weight: 0.40 oz. (11.3g)
- › Dimensions: 1.62x1.06x.57 in. (41.2 x 27.0 x 15.3mm)
- › Input voltage: 3.2 to 9.6V
- › Channels: 3
- › Current requirements: 40mA @ 4.8V
- › Antenna length: 3.6/8.5 in.

connected to a Futaba PCM system were to start from the full left position and sweep all the way to full right, the movement of the servo would be broken down into 1,024 steps. It usually happens so fast that it's virtually seamless. The Spektrum has 4,096 steps of resolution, a little less than four times that of any other popular system.

The Spektrum DSM module is simply installed in place of the factory module in selected radio systems. Our test system is installed in the Airtronics M8, but it will be available for most popular radio systems that include a factory module. "Binding" the receiver to the module is a quick one-step process, and it's the only setup required to make the Spektrum fully functional. The high 2.4GHz frequency means the short antenna seen on the module is all that's required. The collapsible standard antenna isn't functional as long as the Spektrum module is installed, so it can be removed if desired.



SPEKTRUM Q&A

IS THE RESPONSE TIME FAST

ENOUGH? Latency (response time) is a measure of how long it takes from the time you move the steering wheel or throttle to the time the servos or the speed control react in the car. Even in sport radios, it's often so fast that the delays are undetectable, but for the people who race their radio stats, the Spektrum has the fastest response time ever—5.6 milliseconds.

DO I STILL NEED TO IMPOUND MY

RADIO? The Spektrum's ability to seek an open channel and its other robust anti-interference features mean that Spektrum-equipped radios don't have to be impounded. They can't interfere with conventional radios, and they can't be turned on within their own band unless there's an open channel, so only paranoia and faulty logic would land your radio in the impound, but some tracks may still require that you hand over your transmitter.

WHAT ABOUT FREQUENCY CLIPS AT THE RACETRACK?

The technology of the Spektrum will eventually eliminate the need to monitor frequency usage. You don't have to worry about frequency clips on the drivers' stand, and race officials won't have to scan the system to see if it's on a legal band because it's global, and it's fixed. Nobody will need the "funnies" anymore.

CAN I BIND EXTRA RECEIVERS FOR USE WITH MY OTHER CARS? You can bind an unlimited number of receivers to the same transmitter. Extra receivers are available for a retail price of about \$80 each.

WHICH RADIOS WILL WORK WITH THE SPEKTRUM? At the time of our testing, the Spektrum for the Airtronics M8 was the only one available, but by the time you read this, modules should be available for the KO EX-10 Helios and EX1 Mars, the Futaba 3PJ and 3PK, the JR 756 and R1 and the Hitec Lynx 3D, CRX and SRX.

IS IT LEGAL OVERSEAS? International acceptance of the 2.4GHz band means you can use the radio system that you use at home overseas. Current radio technology requires a module and receiver tuned for approved frequencies that are often unique to one country or one part of the world. In addition, all 2.4GHz devices (RC and everything else) are limited to a maximum of 1 watt of transmitting power, and that eliminates the potential of your RC signal being crushed by powerful 100,000W signals from industrial users as it could on the 27 and 75MHz bands.



The Spektrum receiver is installed and outwardly functions in much the same way as a standard receiver. The magic that happens inside the housing is transparent and rock-solid in terms of reliability. Like the transmitter module, the receiver needs only a short 3.6-inch antenna for maximum radio range.

HOW SUSCEPTIBLE WILL IT BE TO INTERFERENCE? Interference with the Spektrum is highly unlikely. The 2.4GHz band is very far from the spectrum in which most model-generated interference occurs. Motor arcing, metal parts contacting each other, noise from a speed control and the vast majority of interference that comes from within your RC car happens mostly below 300MHz. At 2.4GHz, the Spektrum is immune from the nuisances that plague our current radio systems, and that eliminates the need for anti-interference measures such as capacitors and other devices. There are also numerous defenses against other potential interference sources. As previously stated, all devices using the DSSS standard must have the ability to seek an unused channel. In the unlikely event that defense is bypassed, the GUID would reject any signal that didn't have the proper ID. If a rogue signal was on the same channel and somehow managed to be using the same ID, it would have to be on the same part of the band as the Spektrum unit. The band has the equivalent of 100 data paths (think of a 100-lane freeway). The interfering signal would have to be in the same "lane" or on one of the adjacent lanes for it to have a chance to break in (and even then, the built-in fail-safe would save you). Basically, interference is just this side of impossible.

The Spektrum receiver includes a single setup button, which is used to "bind" it to the transmitter during initial setup. Two holes molded into the housing permit different antenna routing depending on the installation.

HOW MANY CHANNELS ARE AVAILABLE? The 27 and 75MHz bands currently in use in the U.S. have 6 and 30 channels, respectively. Although that's technically enough channels to do what we have to do, the burden has always been having enough spare sets of crystals to be reasonably certain that you'll have an open one when it comes time to race with 10 or more other cars. The Spektrum has more than twice the number of channels, so there's no need to spend extra moola for channel changes. The number of available channels is determined by the Spektrum developers, and there's plenty of room on the band to add more channels down the road, but it's inconceivable that more would ever be needed. The distance between the channels allows many simultaneous streams of information from optional telemetry devices.

WHAT ABOUT CELL PHONES, CORDLESS PHONES, WIRELESS ROUTERS, ETC.? All wireless devices on the 2.4GHz have to include collision-avoidance technology—no exceptions. There could be 20 cordless phones, as many wireless routers and a multitude of other devices, and the result would be the same: no interference.

IS ANY PERFORMANCE LOST DUE TO THE SHORT ANTENNA? The high-frequency 2.4 GHz band requires a short antenna. The Spektrum receiver comes with an 8.5-inch antenna, and it's every bit as effective as the really long antennas included with the 27 and 75MHz receivers. In fact, the included antenna is 8.5 inches long so that it can make its way out of

a receiver box. According to the instructions, it can be cut to 3.6 inches for touring cars and other installations without any loss of performance. The antenna should be installed so it stands vertically, but it doesn't have to come through the body at all.

IS THERE A FAIL-SAFE? The positions of the steering and throttle/brake channels are stored, so in the highly unlikely event of signal loss, the servos will return to the preset fail-safe positions. Here's the bonus: even if your radio gets stuck in impound, when you flip on the receiver switch, the servos will still go to their present fail-safe position. That will be especially helpful when warming up gas cars; you won't have to worry about the engine revving too high when you look away.

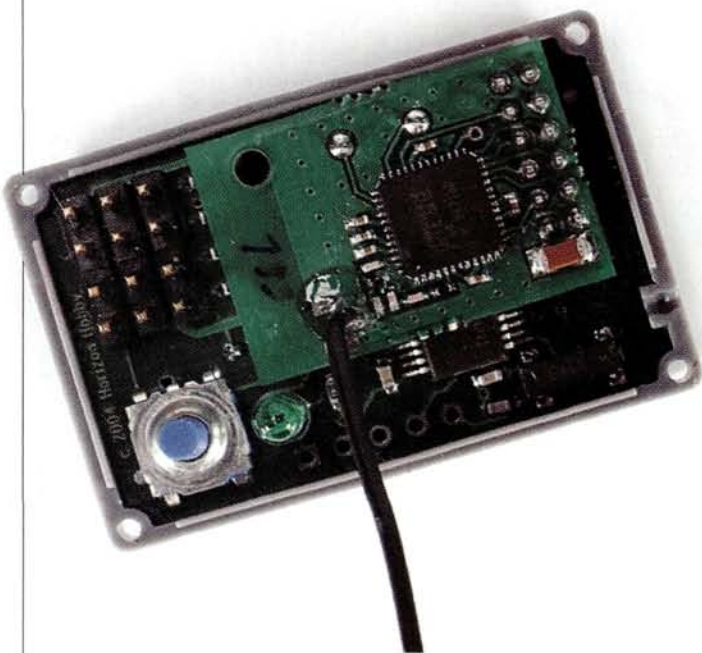
HOW MUCH POWER DOES IT REQUIRE? The Spektrum receiver draws about 40mA. This is higher than the 12 to 15mA drawn by standard radio receivers, but when the servos are drawing upwards of 1000mA, this is insignificant. On the other hand, the module draws only about 120mA, which is about 40 percent less than a standard radio. That means you'll get long life out of the transmitter batteries.

WHAT SHOULD I DO WITH THE STANDARD ANTENNA? Ordinarily, operating your transmitter with the antenna removed or collapsed can damage it, but the Spektrum module disables the original antenna, so it can be run collapsed or removed entirely.

TELEMETRY IS HERE!

Horizon promises that telemetry options will be available for the Spektrum system, and the first is described on the Spektrum website (spektrumrc.com): "The first optional telemetry module will include the ability to monitor real-time engine temperature, engine rpm, speed in mph or kph, battery voltage, signal strength and individual lap times. You'll even be able to record the data and review it later on your PC. We hope to have this telemetry module available in early spring." It also indicates that the information will be read on a hand-held display that you or your pit man can read from anywhere on the track to monitor engine performance.





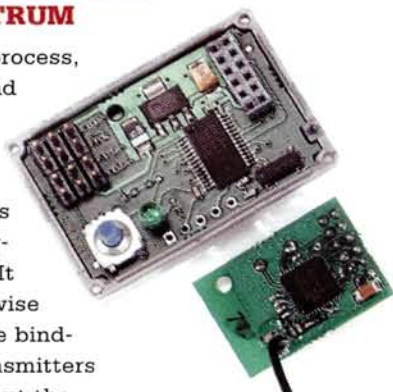
The inside of the Spektrum receiver features a double-deck circuit board (see below) and high-tech surface-mounted processors. All this horsepower is used to process the signals sent back and forth between the module and receiver.

TESTING THE SPEKTRUM

During a quick "binding" process, a button on the receiver and one on the transmitter are pressed so the two components can be synchronized, and that ensures that the receiver will recognize only that transmitter. It only takes a moment. It's wise to be aware of other people binding their receivers and transmitters in the immediate vicinity, but the chances of a mix-up are slim. The binding range is only 5 to 6 feet, and someone would have to be in exactly the same stage of the process in order for your receiver to "listen" to the wrong transmitter. If there were a problem, you would just have to rebind your system.

I installed the Spektrum in an XRAY T1 Factory kit and spent quite a bit of time racing the car at Hobby Chamber in West Haven, CT. The track's tall drivers' stand places transmitter antennas inches from the roof's steel trusswork, and glitching isn't uncommon even with high-end radio systems. The Spektrum performed and continues to perform flawlessly. It simply operates glitch-free every time the car is on the track.

Track interference should never be a concern, but we have discovered certain hot spots where even the best radios have been known to glitch or shut down due to interference. One of the worst is the upstairs hallway of our building. It's about 200 feet long and notorious for trashing cars. It's surrounded with fluorescent lights, copiers and printers that combine to produce the toughest environment we've ever



seen to test a radio system. It's virtually impossible to make it end to end for without hard glitches that can re-kit a car in the blink of an eye. Even here, the Spektrum performed transparently—no hits, no glitches.

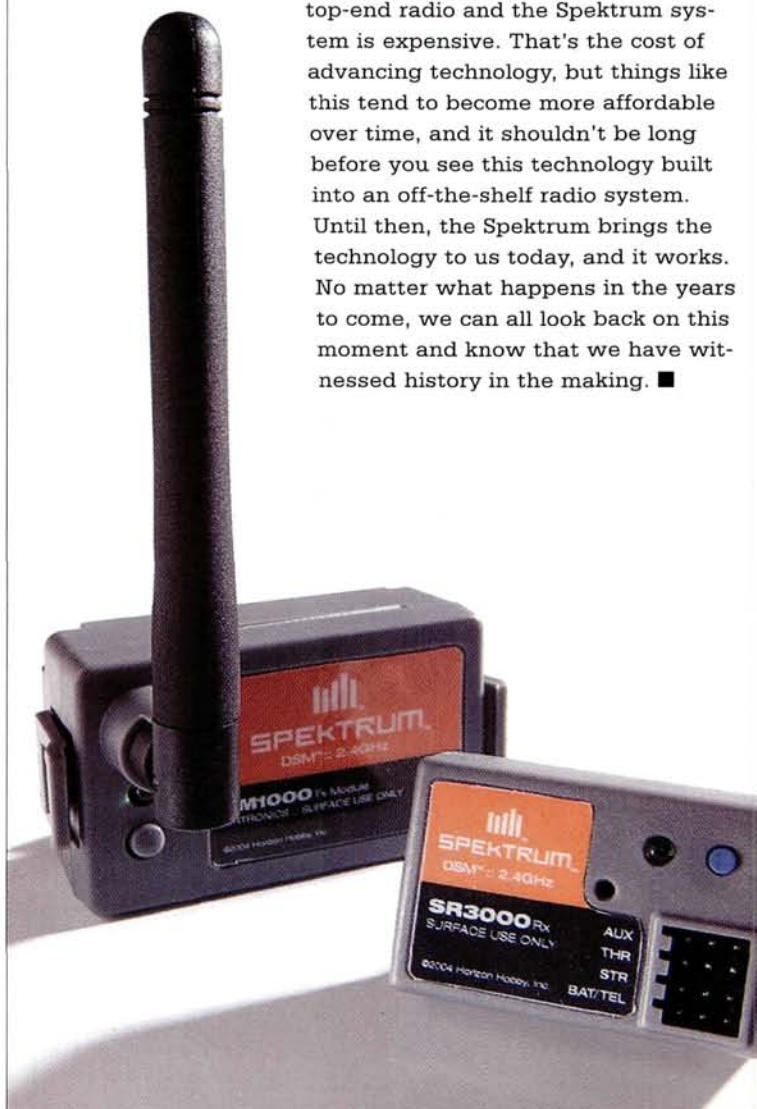
A more recent discovery is the area under my desk. My computer, combined with an electrical outlet and a gaggle of networking plugs, causes fierce glitching even at close range when I set up radio gear on my bench. This became apparent when we used the standard M8 to pilot the cars in the new Virtual RC simulator. After I had installed the Spektrum, the interference disappeared.

The only function we could not test was the Spektrum's channel-seeking capability, since we were not testing it alongside other Spektrum users. But we can cite the experience of factory team drivers who have been racing with the system and say that it does perform as promised—just switch it on, and the Spektrum does all the channel-surfing.

THE VERDICT

The Spektrum system is an incredible leap forward in radio technology that will reshape the future of RC. Yes, buying a

top-end radio and the Spektrum system is expensive. That's the cost of advancing technology, but things like this tend to become more affordable over time, and it shouldn't be long before you see this technology built into an off-the-shelf radio system. Until then, the Spektrum brings the technology to us today, and it works. No matter what happens in the years to come, we can all look back on this moment and know that we have witnessed history in the making. ■



◉ FIND IT

➤➤➤ Go to page 244 for manufacturers' contact information.

Associated B4 Pro Buildup

10 WAYS TO PUT IT TOGETHER LIKE THE TEAM

TODAY'S RACING KITS ARE BETTER THAN EVER, and all you really have to do to assemble a race-ready ride is follow the instructions and take your time during the build. But if you want to give your car an edge, there are team-driver tweaks that aren't in the manual but can shave tenths off your lap times, increase durability, or just make your car more convenient to wrench on. This month, Team Associated's Brent Thielke and Kurt "Coach" Wenger give us the lowdown on building a better B4—and you can use most of their tips on your T4, too.



Associated Team manager Brent Thielke (left) and R&D guy Coach Wenger (far left): Masters of the B4.



Don't apply a ton of grease; a small amount is sufficient. Wipe off any excess that squeezes out when you assemble the servo-saver.



PHOTOS BY PETE HALL

1. SLICKER SERVO-SAVER

When assembling the servo-saver, lightly coat the sliding pivot with Team Associated's black grease. This will help the servo-saver to function more smoothly and resist "stickiness." Clean the area and relube it after every 50 runs or so. If conditions are extremely dusty or sandy, you should clean and lube it more frequently.

2. TOUGHER TOWER

When installing the front shock tower, be sure to fully tighten the screws that are used to attach the tower to the front assembly. Pre-thread the screw holes in the shock tower for a tighter fit, or use a 0.111-inch reamer to clean out the shock-tower holes so the screws can pass through and squeeze the assembly together tightly.



A reamer is the best tool, but a no. 34 drill bit can also do the job.



Stop! The black coating resists rust and reduces friction—no polishing required.

3. DON'T POLISH THE PINS!

The B4 hingepins are made of extruded music wire that has a special anti-rust coating. Many people try to polish the hingepins for smoother suspension movement, only to create a suspension bind because of the rust that inevitably attacks the bare metal. The hingepins require no maintenance other than a wipe-down whenever you have the car apart.



Ream out the inside holes in the rear arms to prevent them from binding.

4. BIND-RESISTANT ARMS

To be sure that the rear arms operate freely and don't get sticky with dirt and dust buildup, it helps to ream out the inner hingepin bores. A 0.111-inch drill bit (also known as a no. 34) is the perfect tool for this job. But don't chuck the bit into a drill or you may deform the arm bore. Just turn the bit by hand.



Running Velcro® to secure the body to the chassis is super-trick and much easier on the body than body clips.

5. BETTER BODY MOUNTING

When a body is held onto the chassis by posts, it tends to accelerate body fatigue. As an alternative, most of the factory drivers apply a thin strip of Velcro® along the chassis' sides and to the inside of the body. It's best to put the "loop" side on the body and the "hook" side on the chassis because the loops usually wear out before the hooks. Plus, it just looks funny to have fuzzy strips on the side of your chassis, like it has sideburns or something.

4 track-tuning tips

RIDE HEIGHT

The B4 is extremely sensitive to small ride-height adjustments. By changing the ride height (via the shock preload spacers), you can affect jumping, landing, cornering and overall feel. This is the first thing we tune when we get to the track. Experiment with different combinations, and take note of the effects each adjustment has on the car.

BATTERY POSITION

Cut the standard foam battery pad in half and experiment with the battery's location. Since the battery is the largest weight mass on the car, moving it even a few millimeters makes a huge difference in the handling.



Try varying the height of the gurney flap to alter your wing's downforce.

GURNEY FLAPPING

The "Gurney flap"—a thin vertical strip at the trailing edge of the wing—has made its way to RC. Changing the height of the flap affects the car's off-power steering, midcorner stability and jumping characteristics. Trim a few wings so they have different flap heights, and test each one for best handling.

ADDING WEIGHT

A 1/4 ounce here and there can have a real effect on the car's handling. Weight is commonly added to the front bulkhead or in the triangle-shaped areas next to the battery at the rear of the chassis. Weight in the front can increase turn-in and decrease wheelies; weight in the rear helps plant the car better in rough or slick conditions.



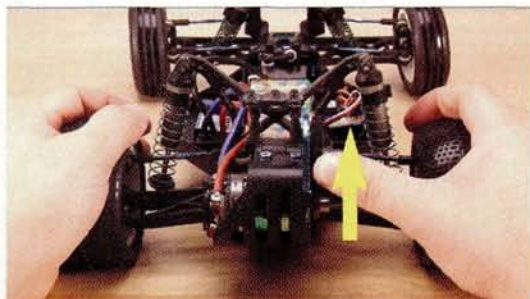
Stick-on weights make it easy to precisely adjust the balance of your B4.



A thin strip of foam will prevent your cells from moving around.

6. BATTERY-RATTLE STOPPER

When using the Factory Team woven-graphite battery strap, the cells tend to rattle as the car goes over bumps. To cure this, add a strip of foam to the underside of the strap to "pinch" the cells and prevent rattling. Most drivers use the battery-tray adhesive pads from the B2 (item no. 9235) and cut the strip to length. You can also use craft foam to do the job—it even comes in colors. Just glue it to the strap.



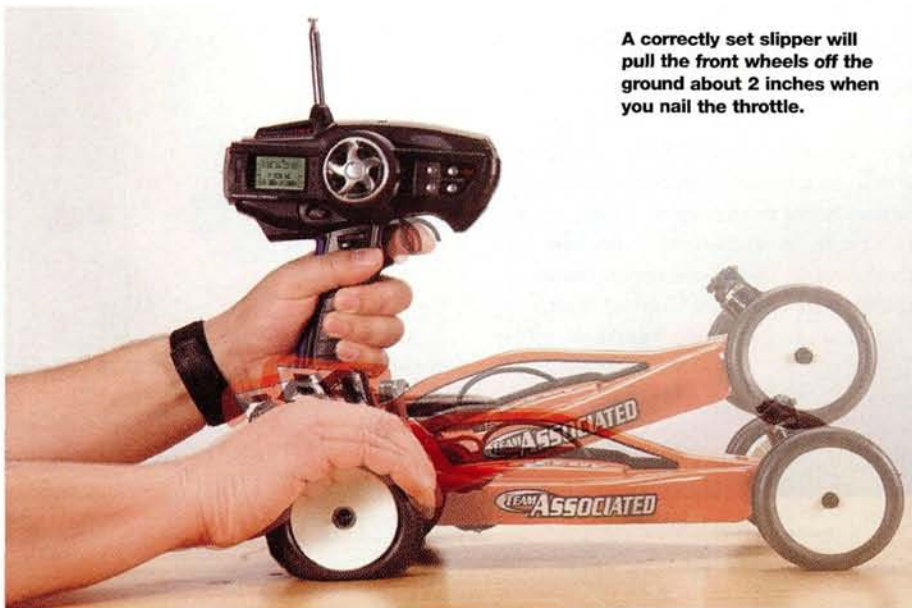
Make sure the slipper clutch does the slipping, not your diff.

7. SPARE THE DIFF!

When you break in the diff, make sure that the slipper setting isn't too tight. When all the slipper parts are new, the stiction is greater, and that makes it very easy to slip the diff (which is terrible for the balls and rings). Use the "thumb test" to make sure the slipper will "give" before the differential does. Hold the tires and try to turn the spur gear with your thumb; it should slip with some effort. Make sure the gear turns, but not the top shaft. If the top shaft is turning, it's the diff that's slipping, not the slipper clutch. After the diff is broken-in and properly tightened, you can safely run a tighter slipper setting.

FIND IT

>>> Go to page 244 for manufacturers' contact information



A correctly set slipper will pull the front wheels off the ground about 2 inches when you nail the throttle.

8. SLIPPER SETUP

Here's how to get your slipper clutch setting close to optimum before you even hit the track. Back the slipper nut off until it has little tension, and then install a fully charged pack. From behind the car, hold the a tire with one hand and your transmitter in the other. Use the base of the transmitter to press the opposite tire to the ground. Now pull full throttle for a 1/2 second and watch the front end. Tighten the slipper 1/4 turn, and repeat this procedure until the front tires pull off the ground about 2 inches when you give the throttle a quick stab.



The extra pin material (circled) should be ground away for longest outdrive life. Grind a little at a time and test-fit frequently—you don't want to overdo it.

9. GRIND THE CVDs

One trick few people know about is to grind the CVD pins. If you look at the CVDs in the outdrive, you can see that the pins hang out of the drive cups by about 1mm. This increases chipping and wear on the outdrives, but you can prevent that with a little Dremel action. Grind the CVD pins so they are just long enough to fill the outdrive slot without passing through it. This is close work, and the pins are hardened steel, so wear eye protection and gloves as you work.



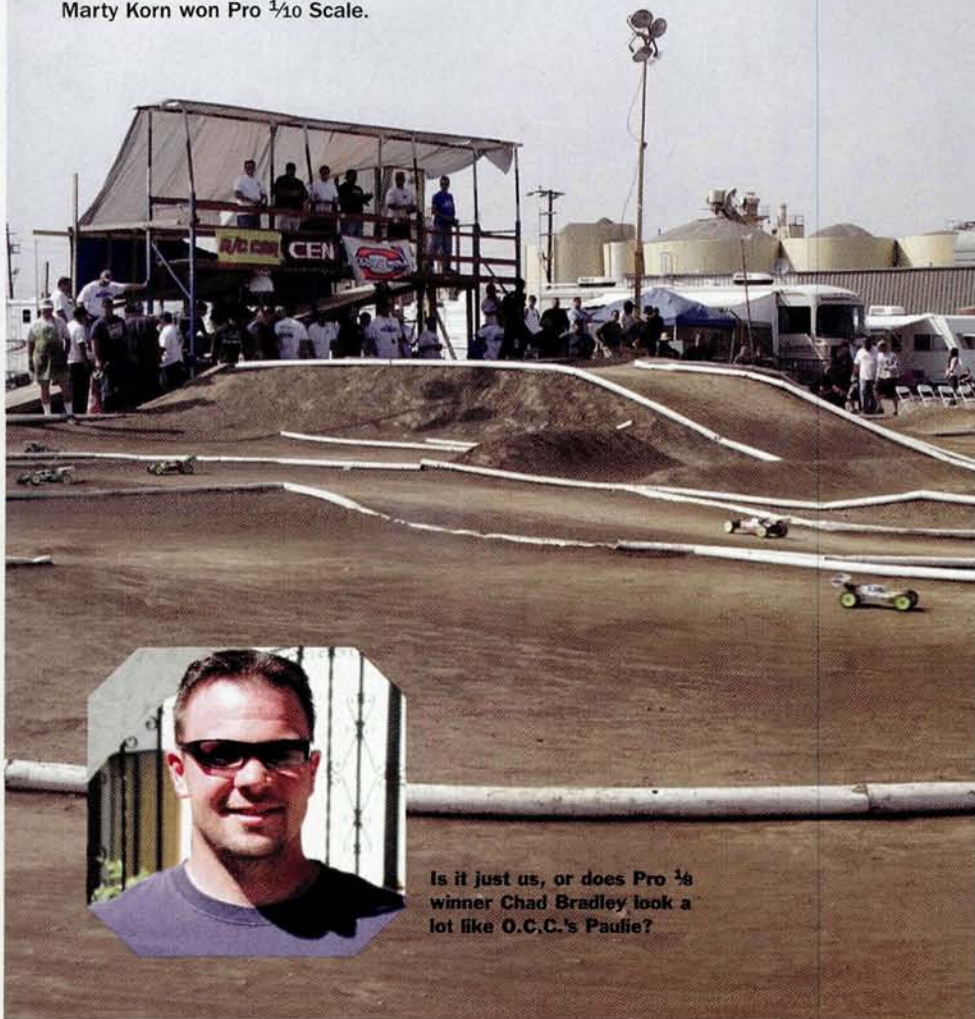
Cool in the shop, hot at the track? Re-bleed the shocks for maximum performance.

10. BLEED ON RACE DAY

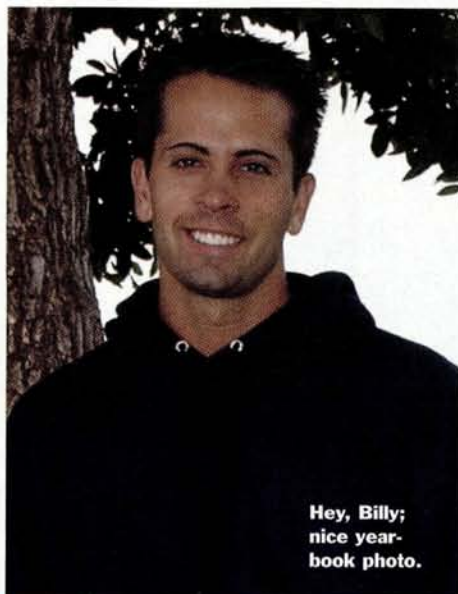
We're talking about your shocks—not the red stuff inside you. If the temperature at the track is significantly higher than it was in the shop, it's best to bleed the shocks trackside. If you don't, the cool air inside the shocks from your cushy air-conditioned race trailer will expand in the trackside heat. That will increase the pressure inside the shocks and alter the handling. ■

BRADLEY & KORN: BEST OF THE WEST

The first annual Best of the West series concluded in the SoCal area; more than 200 nitro racers competed in the final at Sun Valley/Marvin's Hobbies and Raceways. Mugen ace Chad Bradley took home top honors in Pro 1/8 Scale, while Team Associated/GS Racing's Marty Korn won Pro 1/10 Scale.



Is it just us, or does Pro 1/8 winner Chad Bradley look a lot like O.C.C.'s Paulie?



Hey, Billy; nice year-book photo.

EASTON SIGNS WITH TRINITY, LOSI & NOVAK

Billy Easton bounced around a bit after leaving Team Associated as the reigning IFMAR electric off-road world champ, but it looks as though he has put down some real roots at last. He just signed with juggernauts Team Losi and Team Trinity, and he will equip his cars with Novak electronic gear to race in both on-road and off-road classes in 2005. On the 1/8-scale front, Billy will stick with Thunder Tiger, his sponsor for the last two years. Now that the new S3 is in production, Billy should be an even bigger force in the big-buggy class.



"Welcome to Trackside Hobbies. May we help you?"

NOVAK TOURING CHAMPS: BURCH BRINGS IT

Team XRAY's Ralph Burch TQ'd and won the hotly contested modified touring class at the Novak U.S. Touring Car Championships held at Trackside Hobbies in Brookfield, WI. Burch and second-place finisher Mike Dumas both drove new XRAY T1 Factory cars equipped with a few "in-development" prototype parts. New Epic 9-turn Cobalt modified motors using the Trinity XXX Silver brushes powered both cars, with Burch sporting SMC and Dumas running Epic batteries. Losi also made a good showing at the event and took home the 19-turn trophy, thanks to Brian Kinwald's wheel work with his JRX-S. Ray Darroch got it done in stock class with a Triple-XS, and Charlie Suangka put together the brushless-class win with his Novak-powered Tamiya ride.



BABCOCK SERIES WRAP-UP

When the Jimmy Babcock Racing League (JBRL) concluded its fall series at Hot Rod Hobbies, it was another exciting, successful run for the popular series. In '05, the JBRL will have an eight-race series for off-road and a six-race series for on-road; we'll keep you posted.

4WD Modified	Brian Sullivan
Modified Truck	Ryan "Neck" Dawson
Modified Car	Ryan "Pudge" Cavalieri
19-Turn Truck	Casper
19-Turn Car	David Burnell
Expert Stock Truck	Cody King
Expert Stock Car	Jeremy Hase
Sportsman Stock Truck	Jon Wachter
Sportsman Stock Car	Brian Valles

PRO-LINE MAXX CHALLENGE CHANGES

The '05 Nitro Maxx Challenge will be back with a few changes for the better. There are now three qualifiers instead of two, and drivers will race five-minute instead of seven-minute heats. Each heat will have 15 drivers, and personal transponders are mandatory. The A-mains will have 15 drivers (12 qualify, with three spot bump-ups) and will last 30 minutes. The B-mains will run 20 minutes, and C-mains and lower will run 10 minutes. The Big Air contest will still be held after the Mains on Sunday. Save May 13 to 15, and sign up asap; this race sells out every year.



DUMAS GETS XRAY'D

In case you missed Dumas' new duds in the Novak race story, here's the official announcement: Trinity driver Mike Dumas will pilot an XRAY T1 factory car for the '05 season. An East Coast guy, Mike is really at home on carpet tracks. The XRAY car can definitely cut carpet. Josh Cyrul won the Cleveland Indoor Champs with XRAY, and XRAY cleaned up at the aforementioned race.



MAXY-MUM BRADLEY

Mugen ace Chad Bradley won the 1/8-scale Maxy Fuel Challenge held at Boggy Creek Raceway in Orlando, FL, with his MBX-5 ProSpec. Kyosho/Sirio driver Ryan Cavalieri took second with his MP 777 Special 1, and third place went to Michael Sharwin, who also ran a Mugen MBX-5 ProSpec.

PRO POLL

Which part of an RC car would you be, and why?



A high-capacity receiver pack 'cause I'm good for at least an hour.
—Jose "JZ" Zayas >>>
Team Losi/Fantom



A modified motor 'cause I like going fast.
—Joe "Shooter" Pillars >>> Team Orion/Team Losi



The shocks because I'm always working hard.
—Jeremy Kortz >>>
Kyosho/O'Donnell



The air filter because I can always filter out people's bulls\$%!
—"King" Richard Saxton >>> Thunder Tiger/O'Donnell



The wing 'cause I am always "wingin'" it.
—Scottie "seriously, don't call me 'Squirrel' anymore" Hughes >>> Pro-Line/Mugen

UNDER THE HOOD

Adam Drake's OFNA Jammin' X1 CR

RACE: RC PRO NORTH SERIES



RACE GEAR

Transmitter Airtronics M8 w/Spektrum 2.4GHz module

Receiver Spektrum SR3000

Steering servo Sanwa ERG-VX

Throttle servo Airtronics 94757

Receiver battery HT Batteries (lithium-ion)

Engine Sirio/Kanai EVO 2 .21

Clutch Kyosho

Pipe Sirio 2013

Fuel Trinity Platinum 30%

Plug Sirio no. 7

Tires Pro-Line Crime Fighter M2

Body Jammin'

Gearing 14/48

SETUP

	FRONT	REAR
Camber	2 deg. negative	2.5 deg. negative
Caster	"B" blocks	-
Toe	2 deg. out	3 deg. in
Ackerman	2	-
Ride height	Just below rear	Arms level
Swaybar	2mm	2.6mm
Swaybar preload	2mm	5mm
Shock fluid	50WT	37.5WT
Shock piston	53/53	53/53
Shock spring	Blue	Blue
Upper shock mount	2	2
Lower shock position	2 (inside)	2 (inside)
Upper arm/camber link (tower)	2	5
Rear camber link (hub carrier)	-	1
Rear hub/wheelbase	-	Back
Rear-hub arm mount	-	2
Anti-squat plate	-	2.5
Wing angle	-	1/1
Diff fluid	5,000 (front); 10,000 (center)	2,000 (rear)

FACTORY & AFTERMARKET OPTIONS

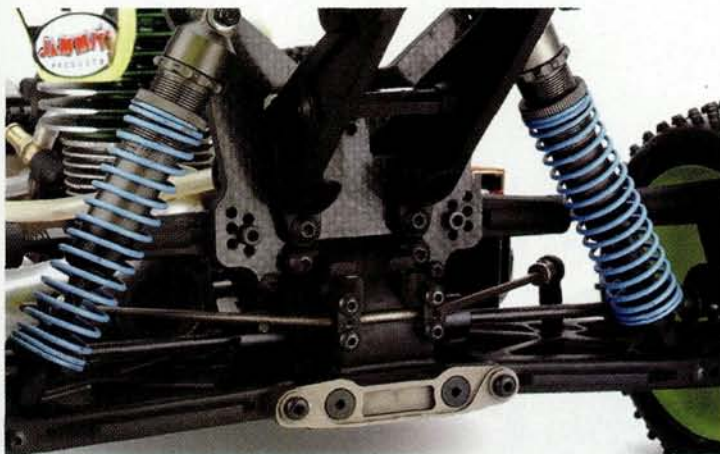
Jammin' Products

■ Engine mounts

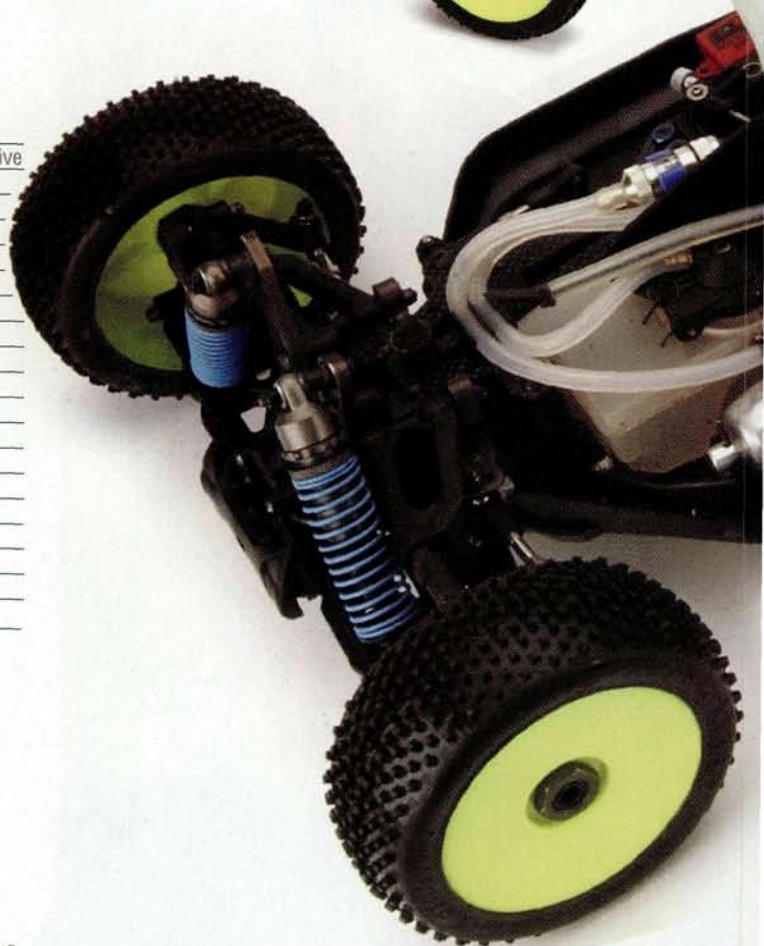
■ 7075 aluminum upper and lower B blocks

■ Hingepins

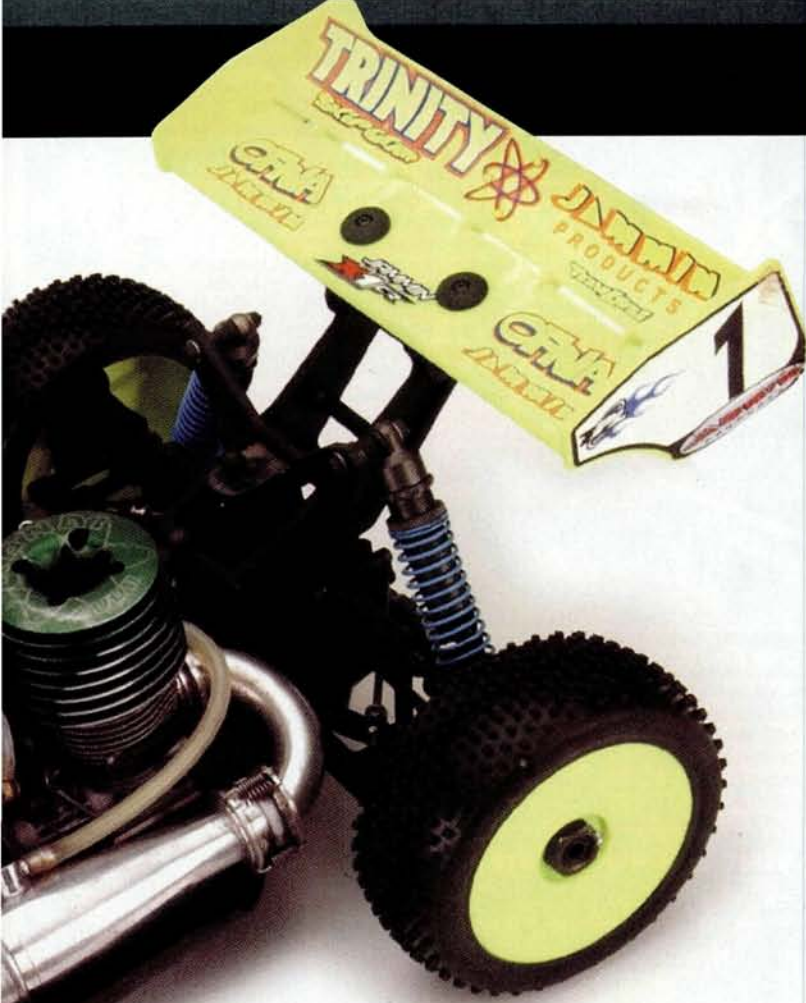
■ Graphite rear shock tower (prototype)



The graphite tower isn't as strong as the stock 7075 machined-aluminum tower, but it's considerably lighter. The optional Jammin' hingepins are secured on the other end with locknuts.



The X1 CR has an amazing amount of steering throw; the steering arms are parallel with the suspension arms. For extra insurance, Adam added locknuts to the screws that secure the steering rod ends.



FIND IT

» Go to page 244 for manufacturers' contact information

Factory Driver HOT MOD

Instead of a typical 5-cell Ni-MH hump pack, Adam uses a 2-cell lithium-ion receiver battery pack because it's much lighter, provides more powerful and consistent voltage and has more capacity. The circuit board is actually a regulator that's custom-made by Novak.

The regulator limits the voltage that goes into the receiver to 6 volts, and it has a cutoff to protect the delicate Li-poly cells from over-discharging, which can cause permanent damage to the pack.



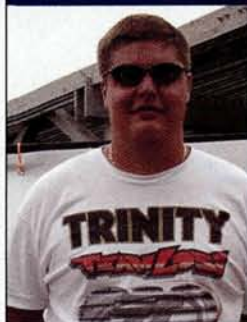
5 QUESTIONS

DRIVER: ADAM DRAKE

AGE: 25

LAST BIG WIN: RC PRO NORTH AT DIRT COUNTRY

SPONSORS: TEAM LOSI, TRINITY, JAMMIN' PRODUCTS, SIRIO, OFNA, TEMPGUN.COM, AIRTRONICS, LUNSFORD, MIP, NOVAK, SPEKTRUM, A-MAIN BODIES, PRO-LINE, SKIPGEAR.COM, MAXSPEED DESIGNS AND KING HEADS



WHEN I'M NOT RACING I LIKE TO: WORK AROUND THE HOUSE AND PREPARE FOR THE NEXT RACE.

RC CAR ACTION: You were pretty much a one-man team for the R&D and testing behind the Jammin' X1. What were some of the highs and lows during the final development of the new Jammin' buggy?

ADAM DRAKE: It was a great experience to work with Jay Halsey and Mike Dunn. One of the highs came during its very first race, which was the Silver State Nitro Challenge. We worked very hard to get the new buggy ready for it. Jay and Mike were both there to help me. Since I was the only one racing it, there was a lot of pressure on me; we were anxious to see how the new buggy was going to do. It worked awesome and opened a lot of eyes. Everything went very smoothly with this project, and we really didn't have any lows. We just have a great time racing together, and we try to have fun.

RCCA: What reaction did you get when you showed up at the track with your mystery buggy?

AD: Everyone has an opinion about what should or shouldn't work, but I don't really worry about what others think or have to say when it's negative. I just do my best for myself and the companies I race for.

RCCA: So how has the X1 CR been holding up in competition? Is it as competitive as the Kyosho 777 SP1 or the Mugen MBX-5?

AD: The buggy has been holding up very well. It's great and is very competitive with all the other buggies on the market. I think it's the best 1/8-scale off-road buggy you can get. You don't need to buy any hop-ups with this kit, and the stock setup works great on most tracks.

RCCA: Do your setups differ considerably from track to track, or does the base setup work well for most conditions?

AD: I run this setup pretty much everywhere. I sometimes change the diff oil for a specific track condition, or I'll switch the shock oil if the weather is really hot or cold. I also change the swaybars from time to time, but that's about it. I'd rather spend more time getting used to the track than dialing in my machine.

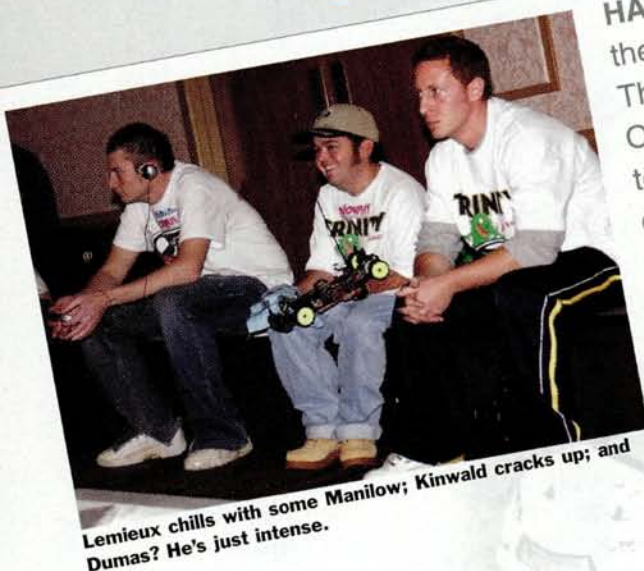
RCCA: How do you like the Spektrum 2.4GHz module and receiver?

AD: The new Spektrum system is unbelievable. It will make it easier for racers, race directors and organizers. You don't need to have a radio impound and extra crystals or worry about antennas getting ripped out or radio interference. You don't even have to check which frequencies the other drivers are on—how cool is that? This system is going to revolutionize RC racing. ■



Josh rocked Cleveland with his XRAY T1 and homegrown CEFX 1/12-scale ride.

THE 25TH ANNUAL U.S. CYRUL CLOBBER



Lemieux chills with some Manilow; Kinwald cracks up; and Dumas? He's just intense.

HAS IT REALLY BEEN 25 YEARS? It's hard to believe that the U.S. Indoor Championships, which are held every Thanksgiving at the Holiday Inn Hotel in Independence, OH, celebrated its 25th anniversary in 2004. That's a quarter century of racing! The U.S. Indoor Champs is not only one of the oldest RC races; it's also one of the toughest events to compete in. Much of this has to do with the fact that the best drivers from the U.S. and abroad compete in the highly competitive 1/12-scale and Touring Mod classes, and that the track layouts are always tight and technical. The 2004 event was no different in terms of the many talented drivers who typically compete each year, but the new longer, faster track layout and the T-Spec exhibition class with a \$1,000 grand prize donated by Trinity put the excitement meter into the mercury.



Smokin' in the ballroom. Once the crew rolls out the Ozite, the Ramada Inn is ready for a different kind of dance.

by George M. Gonzalez

INDOOR CHAMPS ERS CLEVELAND

SPONSORED BY >>> TRINITY >>> RC CAR ACTION >>> CRC >>> GOLD PEAK >>> PARMA PSE



Brian Kinwald (7), Chris Tosolini (4) and Ralph Burch (9) show off their Parma Alfa shells—the same body chosen by all the Mod Touring A-Main drivers.

PHOTOS BY GEORGE M. GONZALEZ

NEW IN THE PITS



BRP MINI-T ODA BODY & FOAM TIRES FOR MINI-T

BRP's body comes with window masks, decals and a rear spoiler. BRP also offers Mini-T foam tires for racing on carpet. The long-wearing foam is mounted on original Losi Mini-T wheels that have been precision-ground to 50mm for a lower stance. The tires are packaged in complete sets with front and rear tires. Body—item no. 560, \$12; Tires—523, \$45



PARMA PSE ALFA 200MM BODY

The 190mm version of the Alfa body is very popular with carpet racers—in fact, Josh Cyrul used it at the 2004 U.S. Indoor Championship when he won the Mod Touring class. Parma hopes that nitro racers will also dig the new body. The clear Lexan body comes with window masks and a detailed decal sheet. Item no. 10087, \$26



PARMA PSE ZYTEC 04S OPEN-CKOCKPIT BODY

Molded in your choice of tough 0.030-inch or lightweight 0.020-inch Lexan, the clear 1/12-scale Zytec body comes with window masks and decals. Item no. 10210, \$20

1/12-SCALE MASTERS

TQ Eli Ezrow got the holeshot and immediately took control of the race. Terry Rott and Frank Calandra Jr. lined up behind the leader to form a three-car CRC freight train. Ezrow continued to stretch his lead, and the rest of the drivers sorted out who was following who. Calandra made his way up to second, and Rott fell back to fourth behind Chuck Lonergan. Ezrow, who raced in cruise control the entire way, easily won the 1/12-scale Masters with a cushy seven-second lead. Skip Starkey charged his way up from the back of the pack to claim second. Lonergan had to battle hard to hold onto third.

1/12-SCALE STOCK

Ray Darroch's Trinity Reflex was dialed to perfection and took the TQ honors. Darroch charged ahead in the Main after a very clean start with Paul Ciccarello, Mark Smyka and Wayne Gerber Jr. in tow. After a bobble that changed the running order, Smyka found his CRC car in the lead. Ciccarello took control of second with Darroch close behind. The running order never changed from this point on, but the race continued at a nerve-wracking pace. Smyka took home the major hardware and the 1/12-scale Stock championship; Ciccarello and Darroch claimed second and third.

1/12-SCALE MOD

Team Associated/Reedy driver Mike Blackstock took the TQ honors and was the only driver to break the 40-lap barrier with a 41/8:08.01 best

A-MAIN ACTION

qualifying time. Associated/Reedy driver Jon Orr qualified in second with a 40/8:00.21, and his teammate Barry Baker secured the third spot on the grid with a 40/8:01.40. The Holiday Inn's ballroom was as quiet as a library at the start of the Main, but the decibel needle was pushed into the red when the starting tone went off. Blackstock appeared to get the holeshot, but Cyrul's CEFX ride was in front after exiting the first corner. Blackstock put the pressure on Cyrul as he tried to get back the lead, but he was having difficulty warding off Orr and Baker who were nipping at his rear tires. A slight bobble cost Blackstock his position, and Dumas was there to take second with his Trinity car. Blackstock soon found himself struggling just to claim fourth behind Mike McMahon who had come out from nowhere. After a couple of minutes, Cyrul took a commanding lead that continued to stretch after every lap, and he challenged the rest of the field to keep up with his blistering pace. Cyrul crossed the line first to earn the victory lap and the honor of being the only driver to complete 42 laps at the 2004 U.S. Indoor Champs. Dumas held on to take the second, and Blackstock came back to claim third.

MASTERS TOURING

TQ Eli Ezrow and his HPI Pro 4 set a hard pace to follow. Not only was he the only driver to put in hot, 23-lap runs during qualifying, he did it in three out of the four rounds. In the Main, Ezrow got a good start around the first corner and avoided the carnage taking place behind him as cars

barrel-rolled and crashed into each other. Rick Worth got through the mess to run in second, and 10th-place qualifier Mike Marshall got around seven drivers to claim third. Ezrow packed his bags and checked out

early because he had been in the lead with a huge margin from the beginning of the race. The focus of the race soon shifted towards Worth and Marshall because they were rubbing fenders and racing side by side for second. Ezrow crossed the line for the win just before the buzzer sounded, which meant he was the only driver in the field to run a perfect 23-lap race during the Main. After dueling for several laps, Marshall claimed second, and Worth earned the third-place trophy in a race that certainly gave the spectators their money's worth.

STOCK TOURING

At the sound of the tone, TQ Stephen Sobottka's Associated TC3 got the holeshot, tucked into the first corner and took control the fast line. Jeff Cuffs, Mike Pulfer and Dave Johnson had the same goal and were hot on his tail. After a couple of laps, Sobottka put some



Eli Ezrow is the king of the Masters Classes. He TQ'd and won the Touring Masters and 1/12-scale Masters classes.

FAST FACTS

» THE U.S. INDOOR CHAMPS IS THE OLDEST ANNUAL EVENT IN RC » THE TRACK IS BUILT AND RUN ON THE CARPET IN THE HOTEL'S MAIN BALLROOM, CIRCUIT TV CHANNEL » MIKE BLACKSTOCK'S 11.4 SECOND-LAP TIME DURING THE 1/12-SCALE MOD MAIN WAS THE FASTEST AT THE EVENT



BRP SUPER CAR 18 V2 CHASSIS KIT

The SC18 V2 is BRP's latest 1/18-scale racer. It's equipped with a saddle-pack battery configuration for improved weight distribution. The pan chassis also features a T-plate rear motor pod with damping discs, independent kingpin front suspension and rigid fiberglass construction. Item no. 155, \$110



PARMA TOURING CAR TIRES

Parma has jumped into the touring car foam-tire game. Its Touring Car tires are available in purple—item no. 16000, magenta—16001, cyan—16010 and plaid—16011. They are mounted on 6-spoke, 28mm white wheels. \$20/pair.

space between his car and the rest of the field, but a battle for second was brewing between Cuffs and Pulfer. Chris Mazzola, Ray Darroch and Chuck Lonergan were fighting for third. At the halfway point, Sobottka parked his car momentarily against one of the pipes. That shortened his lead, but he was far enough ahead that the bobble didn't affect his position as much as his momentum. Sobottka crossed the line for the Stock Touring championship. Cuffs' XRAY T1 ended up with second, and Pulfer secured third with his HPI Pro 4.

MOD TOURING

After posting a 25/5:00.63 best time with his brand-new Losi JRXS, Team Losi driver Paul

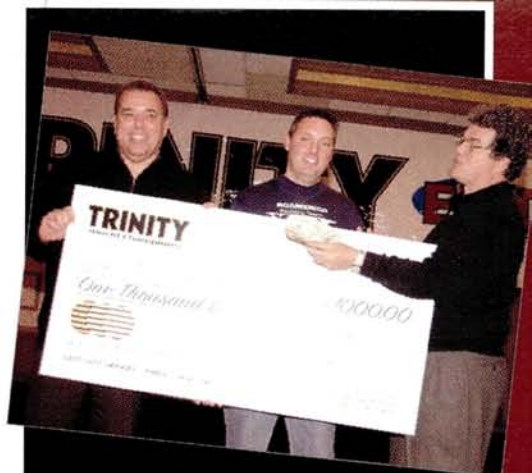
Lemieux stole the TQ position from Team XRAY driver Josh Cyrul in the last round of qualifying. Cyrul got the holeshot and made his way around Lemieux while going around the first corner. Trinity Losi/Trinity driver Mike Dumas and Team Associated/Reedy driver Barry Baker were hard-charging for third behind Lemieux. Cyrul wasn't given any slack by Lemieux, who was bobbing and weaving and looking for a way around the leader. Meanwhile, Dumas, Baker and Team Associated/Reedy driver Mike Blackstock (who was wheeling a brand-new TC4), formed a line behind the leaders and proceeded to snake their way around the course. The loud yelling and cheering by the spectators drowned out the excellent race commentary of Ian Rodgers.

25 YEARS OF BLOWING OFF TURKEY FOR RC

There are many racers who have attended more than half of the U.S. Indoor Championships, and a handful has competed at more than 20 of the events. But there is only one person who has competed every year since the event was launched in Cleveland more than 25 years ago: Chuck Mackin. Chuck has made it a tradition to go on the road every Thanksgiving to attend the U.S. Indoor Champs. He hasn't missed a single year, so that makes him the only contestant with a perfect attendance record. According to Chuck, the event has changed a lot over the years, and the biggest changes have been the advancements in chassis, motor and battery technology—and the fact that he now competes in the Masters classes. Chuck was awarded a plaque and recognized for his dedication. He plans to continue competing at the event and can't wait for next Thanksgiving. I wonder if his family feels the same way?



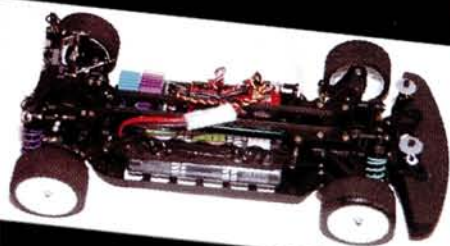
Chuck Mackin (right) is given a plaque for his perfect 25-year attendance at the U.S. Indoor Champs.



Trinity chief Ernie Provetti hands over the big check. Good thing Ralph is getting a cash payout—ain't no way that check is going to fit through the ATM slot.

T-SPEC PAYS OFF!

A T-Spec exhibition class was added to the venue this year, and with a \$1,000 first prize donated by Trinity, there weren't any problems filling the eight available slots. In fact, many willing racers had to be turned away. The drivers who made the final cut were Bud Bartos, Ralph Burch, Frank Calandra Jr., Chris Doseck, Bill Jeric, Tyree Phillips, Terry Rott and Bob Schoenau. All of the contestants competed with equally equipped Trinity T-Spec 4WD touring cars with Trinity 19-turn T-Spec motors, T-Spec batteries, Novak ESCs, TRC tires and Hitec SRX radio systems. Since no car had a speed or power advantage, it came down to driving skill to win the race. Ralph Burch Jr. carved the tightest lines and drove the most consistently, and these traits earned him the \$1,000 prize and the championship.



All of the drivers were given equally equipped Trinity T-Spec cars. All the cars were set up with Trinity motors and batteries, Novak ESCs, TRC tires and Hitec CRX radio systems.

1/12-SCALE MASTERS

FIN	QUAL	DRIVER	CHASSIS	MOTOR	BATTERY	ESC	RADIO	BODY	TIRES
1	1	Eli Ezrow	CRC	Handout	SMC	GM	JR Racing	Protoform	Jaco
2	8	Skip Starkey	CRC	Handout	SMC	LRP	JR Racing	Parma	CRC
3	4	Chuck Lonergan	Associated	Handout	Novak	Novak	KO Propo	Protoform	Jaco
4	3	Frank Calandra Jr.	CRC	Handout	Pro-Match	Novak	JR Racing	CRC	CRC
5	2	Terry Rott	CRC	Handout	Novak	Novak	Futaba	Parma	CRC

1/12-SCALE STOCK

1	3	Mark Smyka	CRC	Handout	SMC	Novak	Airtronics	Parma	Jaco
2	2	Paul Ciccarello	Associated	Handout	Trinity	Novak	Airtronics	Parma	Parma
3	1	Ray Darroch	Trinity	Handout	Trinity	Novak	JR	Parma	JR
4	4	Wayne Gerber Jr.	BMI	Handout	Power Push	Tekin	Airtronics	Parma	CRC
5	5	Chris Mazzola	Associated	Handout	Reedy	Novak	KO Propo	Protoform	Jaco

1/12-SCALE MOD

1	4	Josh Cyrul	CEFX	Fantom	SMC	KO Propo	KO Propo	Parma	Jaco
2	5	Mike Dumas	Trinity	Trinity	Trinity	LRP	JR Racing	Trinity	TRC
3	1	Mike Blackstock	Associated	Reedy	Reedy	Novak	KO Propo	Protoform	Jaco
4	6	Andy Moore	Associated	Orion	Orion	LRP	KO Propo	Protoform	Jaco
5	2	Jon Orr	Associated	Reedy	Reedy	LRP	KO Propo	Protoform	Jaco
6	7	Paul Lemieux	Customworks	TrueSpeed	SMC	Novak	Airtronics	Protoform	Jaco
7	0	Ryan Cavalieri	Trinity	Trinity	Trinity	Novak	Airtronics	Trinity	TRC
8	9	Mike McMahon	CRC	Orion	Orion	Novak	KO Propo	Protoform	Jaco
9	8	Mike Lufaso	Associated	Reedy	Reedy	LRP	KO Propo	Parma	Jaco
0	3	Barry Baker	Associated	Reedy	Reedy	LRP	Airtronics	Parma	Jaco

MASTERS TOURING

1	1	Eli Ezrow	HPI Pro 4	Handout	SMC	Keyence	JR	Protoform	Jaco
2	0	Mike Marshall	Losi Triple-XS	Handout	SMC	Novak	Airtronics	Losi	TRC
3	6	Rick Worth	Associated TC3	Handout	Trinity	Novak	Futaba	Losi	Jaco
4	2	Ray Huang	XRAY T1	Handout	SMC	Novak	KO Propo	Parma	Parma
5	7	Bob Schoenau	Associated TC4	Handout	Reedy	LRP	KO Propo	Parma	Parma

STOCK TOURING

1	1	Stephen Sobotka	Associated TC3	Handout	Fukuyama	Novak	Airtronics	Parma	BSR
2	4	Jeff Cuffs	XRAY T1	Handout	Trinity	Novak	KO Propo	Parma	TRC
3	6	Mike Pulfer	HPI Pro 4	Handout	-	Novak	KO Propo	Parma	CRC
4	3	Ray Darroch	Losi Triple-XS	Handout	Trinity	Novak	JR Racing	Parma	TRC
5	7	Chuck Lonergan	XRAY T1	Handout	Novak	Novak	KO Propo	Protoform	Jaco

MOD TOURING

1	2	Josh Cyrul	XRAY T1	Fantom	SMC	KO Propo	KO Propo	Parma	Jaco
2	1	Paul Lemieux	Losi JRXS	TrueSpeed	SMC	Novak	Airtronics	Parma	Jaco
3	3	Mike Dumas	Losi JRXS	Trinity	Trinity	LRP	JR Racing	Parma	TRC
4	4	Mike Blackstock	Associated TC4	Reedy	Reedy	Novak	KO Propo	Parma	Jaco
5	0	Barry Baker	Associated TC4	Reedy	Reedy	LRP	Airtronics	Parma	Jaco
6	8	Brian Kinwald	Losi JRXS	Trinity	Trinity	Novak	Airtronics	Parma	TRC
7	7	Ralph Burch	XRAY T1	Fantom	SMC	Novak	KO Propo	Parma	Jaco
8	9	Matt Francis	Losi JRXS	Trinity	Trinity	LRP	Airtronics	Parma	TRC
9	6	Todd Hodge	Losi JRXS	Trinity	Trinity	LRP	Airtronics	Parma	TRC
0	5	Chris Tosolini	Corally	TeamBro	Orion	Novak	Airtronics	Parma	Parma

T-SPEC

1	1	Ralph Burch	T-Spec	T-Spec	T-Spec	Novak	Hitec	Trinity	TRC
2	3	Terry Rott	T-Spec	T-Spec	T-Spec	Novak	Hitec	Trinity	TRC
3	7	Chris Doseck	T-Spec	T-Spec	T-Spec	Novak	Hitec	Trinity	TRC
4	4	Frank Calandra Jr.	T-Spec	T-Spec	T-Spec	Novak	Hitec	Trinity	TRC
5	6	Bill Jeric	T-Spec	T-Spec	T-Spec	Novak	Hitec	Trinity	TRC

Lemieux challenged Cyrul for the lead the entire way, but Cyrul managed to close the door each time Lemieux attempted a pass, and he crossed the line first to take the highly respected Mod Touring championship. Lemieux claimed second, and Dumas won the battle for third.

WRAP-UP

The 25th annual U.S. Indoor Championships was a great success. The qualifiers and Mains

went without a hitch, the track layout was terrific, and the track crew did a great job of organizing and running the event. Congratulations go to Josh Cyrul for winning the 1/12-scale Mod and Touring Mod classes and to the other winners in the Stock and Masters classes.

How will Ralph Burch spend that \$1,000? I don't know, but I'm sure it will be on something cool. We'd also like to thank Trinity—

the event's major sponsor—for keeping it going into the next quarter century. ■

FIND IT

Go to page 244 for manufacturers' contact information.



7 Mistakes to avoid on race day

DO YOU CONSISTENTLY FINISH SECOND OR THIRD with your touring car every weekend, and you haven't yet figured out how to get that breakout win? Are you stuck at the top of the B-main and want to make it into the A-main? In this month's column, I cover the most common mistakes I see people make with their cars and the solutions to fix them. So let's see whether these suggestions can get you over that hump and into the winners' circle.



If your body is riding high, you won't be riding high in the final standings.



BODY BASICS

»» **Mistake:** your body is mounted too high.

»» **Result:** a body that is mounted too high can cause a car to handle erratically. At speed, more air flows under the body and creates turbulence, and that can upset the car's balance. A body that's mounted too high can cause unwanted body roll because it raises the car's center of gravity (CG). That can make a car react very slowly, or worse, depending on the tires and the surface, it can cause traction roll and actually flip the car over (think of an SUV going too fast on a freeway off-ramp). Another common mistake is mounting the body so that the front end sits slightly higher than the rear. That makes a car sluggish when switching directions and reduces overall steering.

»» **The fix:** measure body height at the roofline. Check with your local club, and run your body as low as the rules allow. If there aren't any specific requirements, slam it as low as it will go to improve the car's handling. Just be sure that the tires don't rub the body, as that will create a handling problem.

Make sure that the body attitude is correct: the front should be lower than the rear or level with it. Never mount the body so that the nose of the car is higher than the rear.

If you must raise the body to meet the rules, always raise the back first to see whether that will make it legal. Keep the nose as low as possible.

THE LOWDOWN

» Mistake: the ride height is set too low.

» Result: a car that doesn't have the proper ride height will feel inconsistent from corner to corner, may lower overall run time and have slow corner speeds. When the chassis contacts the ground, it takes pressure off the tires, and that

makes the car feel as if it has less traction, resulting in the inconsistent feel. The dragging chassis also causes parasitic drag, which draws amps from the batteries and slows the car in the turns.

» The fix: whenever someone complains about the symptoms above, I first look at the bottom of his car to see whether the chassis is rubbing the track. On asphalt, you can easily see where the chassis is scraping, but on carpet, it's a little more difficult. To check whether the chassis rubs on carpet, I wet a paper towel with motor spray and run it along the bottom edges of the chassis. If the chassis is dragging, the rag will turn black from tire rubber picked up on the track.

To fix this, add $\frac{1}{4}$ to 1 turn of preload into each shock spring. Ultimately, you should always run at the minimum ride height the track allows: for sedans, it's typically 5mm and for $\frac{1}{12}$ scale, it's $\frac{1}{8}$ inch. If your car is set at minimum ride height and it still gets tire rubber on the chassis, consider switching to a harder shock spring, as the car most likely has too much chassis roll.



When running indoors, dampen a clean rag with motor spray and wipe it along the bottom edges of the chassis to see whether it picks up any rubber.



If you run outdoors, check the chassis for signs of scraping to see whether it has come in contact with the track surface.

TIRE TRICKS

» Mistake: running "chunked" foam tires.

» Result: running tires that are damaged or have missing pieces leads to a car that handles inconsistently and makes it impossible to properly tune chassis handling.

» The fix: if your tire has a piece completely missing from the sidewall or in the center, it is junk, and you have to replace it. If a piece of the tire is torn but is still attached, you might be able to glue the piece back and save the tire. I recommend using a slow-drying, thick CA-type glue. Simply dab a drop into the area behind the tear, and hold it for a few seconds while it dries. Squeeze the glue out of the edges so it dries nice and tight.



Running a foam tire with a chunk missing can cause erratic handling.



Running full-size tires (left) will slow down your car's initial turn-in speed, and the higher CG could cause your car to traction-roll. Use a tire lathe to cut your tires down (right).

» Mistake: running foam tires that are too large.

» Result: the increased sidewall flex of a larger-diameter tire will slow down your car's initial turn and could cause the car to traction-roll once the bite increases on the track. Also, larger tires are more prone to tire "chunking" as well.

» The fix: whenever I see a car with full-size tires on it, I always suggest that these be cut down to a smaller diameter to get better performance. As the traction increases, a smaller-diameter tire will allow the car to perform at its best: 61mm is about as big a tire as you want to run on carpet. At large events such as Cleveland Indoor Champs and The Snowbird Nationals, I've seen racers go out on 57mm or smaller tires on their touring cars because their traction is so high. This is how the pros get their cars to switch directions so quickly and carry more corner speed without traction roll.

SAGGING SHOCKS

»» **Mistake:** neglecting your shocks

»» **Result:** a shock that's been together too long may leak oil over time and end up with too much air in it. This is easy to detect, as you will be able to hear a squishing noise as you compress it. You will also be able to feel a dead spot, where there is less resistance compared to the rest of the travel. If you feel or hear one of these symptoms, it's time to rebuild the shocks.

»» **The fix:** before each race weekend, check your shocks for excessive air. Follow the manufacturer's suggested shock-building technique (or your own technique), and be sure to refill the shock with the same weight oil as before. If you have a bad memory, like me, write the weight on the shock cap with a Sharpie, so you'll remember what was in it.



Don't forget to rebuild your shocks regularly. Shocks will leak oil over time, and air will get trapped inside, making the shocks squishy.



To loosen binding steering linkages, gently squeeze the outside of the ball cup with a pair of pliers. This deforms the plastic inside the ball cup and makes it fit more loosely over the ball.

SUPER STIFF STEERING

»» **Mistake:** your steering linkage is binding.

»» **Result:** a bound-up steering linkage will cause the car to track erratically and make it very difficult to drive, especially on small indoor carpet tracks. Often, people assemble their cars and assume that as long as they can turn the linkage with a little force, the servo will be able to handle it as well, but this isn't always true. Most servos have more than enough torque to turn the wheels of any RC car, but if your steering linkage is binding and stiff, and you add inherent front-end slop to the equation, you'll end up with a car that won't track straight. Fortunately, this problem is usually easy to fix.

»» **The fix:** start by detaching all the steering links in the front end. Next, check to see that the steering bellcranks move freely. If they don't, make sure that you haven't over-tightened the screws that hold them to the chassis. Also look at the bearings or bushings to be sure they're seated correctly in the bellcrank. Now, check how freely each ball cup rotates on the ball. Stiff ball cups are typically the reason steering linkages bind. If you find a stiff ball cup, gently squeeze the outside of the ball cup with a pair of pliers. This deforms the plastic inside the ball cup and essentially makes it fit more loosely over the ball. Do this with each ball cup that isn't totally free when you snap it onto the ball stud, and your steering linkage will move freely.

LOOSEN UP

»» **Mistake:** the wheel axle is binding.

»» **Result:** when you have a binding wheel hub, the car tends to pull in one direction off-power, and it will lose run time and overall power as well. You might also hear a strange noise coming from the car (a bearing gone bad from excessive overtightening).

»» **The fix:** typically, two things cause wheel-axle binding on an electric touring car. The first is a poorly shimmed axle. As you tighten the wheel to the axle, it pulls the hex onto the pin and closer to the hub. If the axle isn't shimmed correctly, it will rub on the hub and create a bind. Simply remove a shim from the back side of the axle and allow the axle to float more.

The second reason is a bad bearing. Remove the axles and each bearing, and then slide each bearing over an axle and spin it until you find the noisy bearing. Once you find it, replace it.



An improperly shimmed axle will rub on the hub and create a bind.



Don't crank too hard on your wheel nut. If you excessively overtighten your wheel, it could damage your bearings.

I hope that some of the tips I've shared help you run faster laps and that you'll run to your bench to give your car a good once-over. Although racers may encounter many problems during a race season or even on a race weekend, these are the most common, and they aren't always easy to detect. A great maintenance

program leads to the victory lane; and, remember: take care of the how, and the how fast will take care of itself. ■

OFIND IT

»» Go to page 244 for manufacturers' contact information.



MAXX THRASH

Novak HV-Maxx Brushless System

E-Maxx owners are always on the hunt for more power or extra run time; you just can't have both. Slap in crazy-powerful motors and your run time plummets. But what if I told you that you can now have the best of both worlds—all the power you'd want with spare run time to boot? Sound too good to be true? Well, there is one catch: it will cost you.

Yes, I'm talking about brushless motors. Novak Electronics recently introduced its new HV-Maxx brushless system. Novak boldly claims that its new single brushless-motor system not only provides more power than a stock dual-motor setup, but it also provides longer run times as well (this on top of being virtually maintenance-free). To test this claim, I ran a box-stock setup up against Novak's new unit. I planned to use the same batteries so I would be able to accurately evaluate the differences between the two. Let's take a closer look at what you get with the Novak setup.

Yes, the cooling fan is included!

WHAT YOU GET

NOVAK HV MAXX BRUSHLESS SYSTEM—ITEM NO. 3020; \$280

➤ **High-torque, sensor-based brushless motor.** The HV-Maxx motor is a beast (by that I mean it's big and heavy). It's roughly the same diameter as a stock E-Maxx motor, but it's approximately 1/2 inch longer and weighs in at 13.2 ounces; even without the heat sink, it's still well over 1/2 pound. Still, when you factor in the total weight of two stock E-Maxx motors (17.2 ounces), you're losing 1/4 pound of weight!

Motor features include a powerful, one-piece, cylindrical, neodymium magnet; large ball bearings for smooth operation; and multiple sensors that detect the position of the rotor (this





ensures smooth acceleration and braking) and gauge the motor's temperature to protect against thermal overload.

› **HV-Maxx ESC.** This forward/reverse unit can accept up to 14 cells, and it comes with three built-in profiles: Program 1 features forward, brakes and full reverse; Program 2 is forward/brake only; and Program 3 is forward, brakes and 25-percent-power reverse (this profile is mainly used for marine applications). The ESC also features Novak's Smart-Braking II feature. This setup ensures that you can't slam into reverse until you've returned the brake trigger to neutral and then back

to reverse. The HV-Maxx ESC also has the same footprint as the stock E-Maxx ESC (which, coincidentally, happens to be made by Novak), so the unit drops right into place.

› **Power-Boost cooling-fan kit.** Novak threw in this little freebie to help keep the ESC cool when running under extreme conditions. It plugs right into the ESC.

› **Motor-plate plug.** This handy little dust cover goes over the exposed motor-plate hole (since you're removing one of the two stockers).

QUICK INSTALL (SORT OF)

The Novak HV-Maxx comes ready to go right out of the box; all you have to do is remove your stock E-Maxx electronics and swap it for the new Novak gear—or so you'd think. If you're impatient like I am, you'll want to hold up a minute and take some preventive measures to keep the drivetrain from blowing up. In my haste to test the unit, I simply swapped out the electronics and found out the hard way that the motor is more than powerful enough to munch the stock idler gears in the transmission.

After I had grenaded the tranny, I got on the phone and ordered a few upgrades. Funnily enough, after a more thorough inspection of Novak's instruction manual, I saw the section about recommended E-Maxx drivetrain upgrades—d'oh! You see, Novak found that the power output of the HV-Maxx system was a bit much for the stock components, so in its instruction manual, it recommends front and rear MIP CVDs (and outdrives), a heavy-duty spur gear and slipper (they suggest Robinson Racing) and, finally, metal idler gears. I deviated slightly from the list, though (check out the sidebar on my choice of upgrades).

See the cover for the unused motor position? It's included with the HV-Maxx kit.

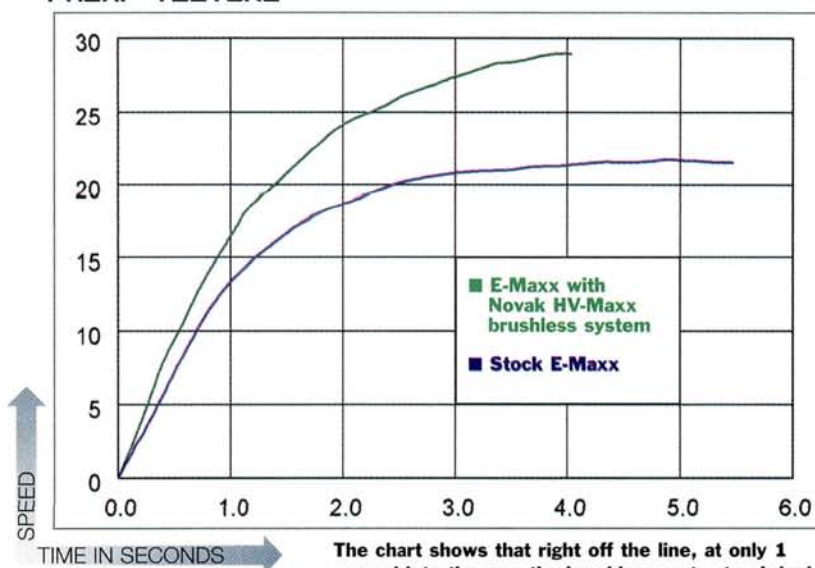


Drivetrain upgrade

After my little tranny "meltdown" incident, I called Robin Oury at Unlimited Engineering for some advice. You see, Robin makes all sorts of cool T- and E-Maxx upgrades (especially in the drivetrain department). He suggested that, at the very least, I start by adding a set of Unlimited's hardened-steel idler gears and replace the stock slider shafts with his titanium center driveshafts and SuperMaxx EXT CVDS 8mm steel axles. Since I was swapping out the stock sliders with the oversize axles, I also had to run a set of SuperMaxx WideTrac knuckles (with the large bearing kit). Finally, based on advice from our in-house trucker Kevin Hetmanski, I also went with Unlimited's SuperMaxx Ultralite 7.5 6-gear diff kit (which comes complete with aluminum cases). I think Kev's words were something to the effect of, "Run the stock plastic housings, and those gears will cut through them like a chainsaw through butter"—how poetic.

The Unlimited parts definitely make a big difference when it comes to keeping the truck together. The only thing I didn't add initially was a different spur gear, but I think I'll add one soon (I learned my lesson only after I had stripped out my sixth or seventh set of stock gears during the test).

RADAR TESTING



The chart shows that right off the line, at only 1 second into the run, the brushless-motor truck had jumped ahead by nearly 3 feet. By the 4-second mark, it had traveled 30 percent farther and led by 28.7 feet!

TEST PARAMETERS

For the test session, I ran a bone-stock E-Maxx with a pair of 6-cell Novak Orange Power GP3300 VE cells that had been through Novak's matching and voltage-increasing system. I ran the truck three times, timed every run and then averaged them to get the base "overall" runtime. At the beginning of each run, I also hit the truck with the radar gun so I'd be able to get an accurate reading of its acceleration curve and overall top speed.

After I had done the first leg of the test, I let the cells stabilize for 24 hours and repeated the process using the HV-Maxx system. As you can see from the charts, the Novak HV-Maxx system provided a steeper acceleration curve and higher top speed (29 mph). It also gave an improvement in run time by roughly 1 minute 40 seconds.

There's no doubt that the Novak HV-Maxx system improves acceleration and top speed (plus there's that slight boost in run time), but as the saying goes: "Speed costs; how fast do you want to go?" The brushless system costs only \$20 less than the truck itself, and when you factor in all the necessary drivetrain bling, the conversion gets pretty pricey. Obviously, this setup is targeted at a select group: diehard E-Maxx owners who want to outfit their trucks with cutting-edge technology and are looking for that extra performance boost. ■

FIND IT

Go to page 244 for manufacturers' contact information.



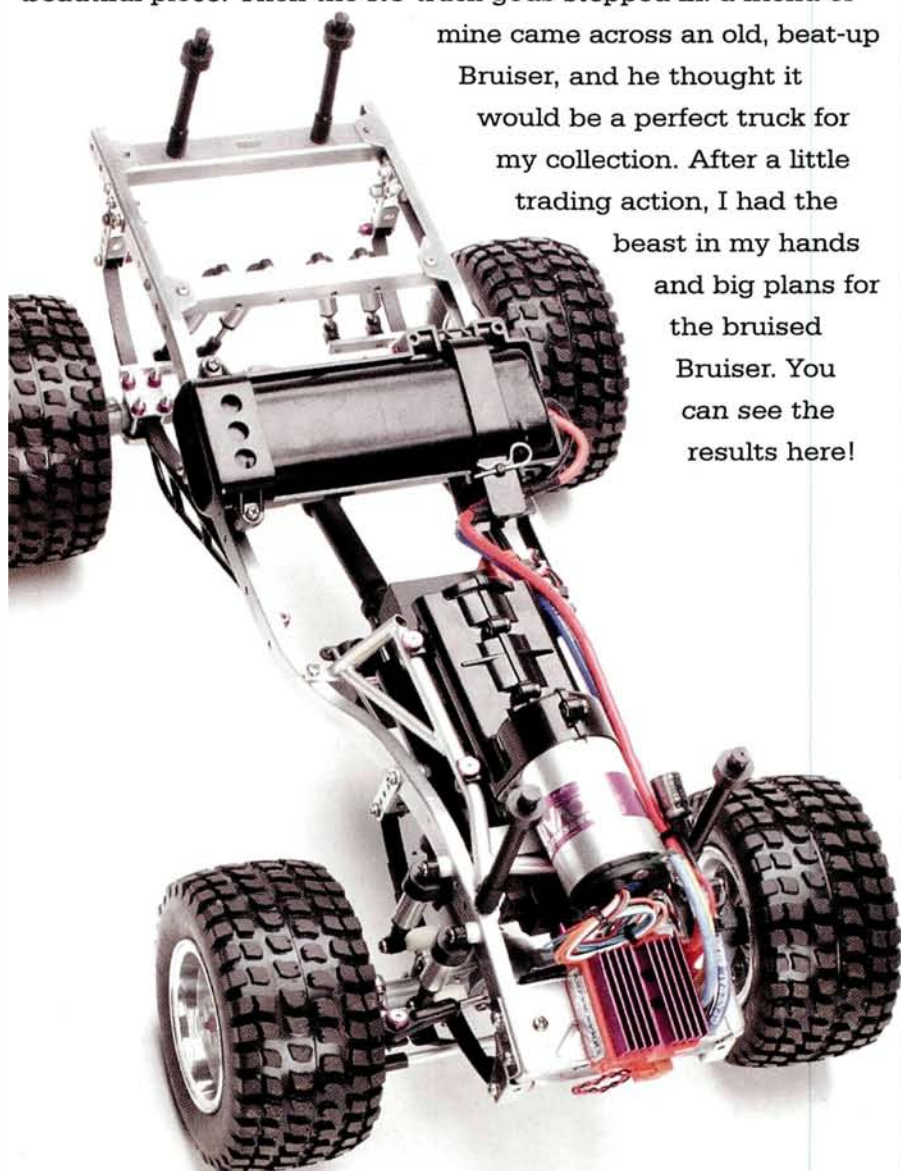
SuperMaxx parts

- » Ultralite 7.5 6-gear diff kit—item no. 13540; \$275
- » Hardened-steel idler kit—13407; \$30
- » Titanium center driveshafts—13513T; \$60
- » EXT CVDS steel 8mm axles (two pairs)—13502S7; \$140
- » WideTrac knuckles with large bearing kit (two pairs)—13140; \$140



Building a **BETTER BRUISER**

I'VE BEEN A BIG FAN OF THE TAMIYA BRUISER since it was released back in the '80s. How could you not fall in love with this metal masterpiece? It's built just like a full-scale truck. I have a mint-condition stock Bruiser that I've always wanted to trick out, but I just couldn't mess up such a beautiful piece. Then the RC truck gods stepped in: a friend of mine came across an old, beat-up Bruiser, and he thought it would be a perfect truck for my collection. After a little trading action, I had the beast in my hands and big plans for the bruised Bruiser. You can see the results here!



Parts

DRIVETRAIN

RC4WD

- Transfer case for Tamiya 3-speed tranny—RC-X001, \$100
- Heavy-duty Bruiser tube front-axle guard—4x4-J06, \$40

Tamiya

- Tractor-truck transmission—item. nos. and prices vary
- 5x11 ball bearings (8 sets of 2)—53029, \$85
- 6x12 ball bearings (2 sets of 2)—53065, \$21

SUSPENSION & STEERING

RC4WD

- Advanced radius arms—4x4-J02, \$50
- Heavy-duty lift kit—4x4-B005, \$40
- Rear quad shock mount—4x4-B010, \$59
- Heavy-duty steering rod kit—4x4-B001, \$29

Tamiya

- Aluminum damper cylinders (2 pairs)—53566, \$13/pair
- Low-friction damper piston set Front F201 (2 pairs)—53567, \$7/pair

BODY & TIRES

HPI Racing

- Jeep Wrangler Rubicon—7182, \$33

Pro-Line Racing

- Dirt Works tires (2 pairs)—1072-00 \$19/pair

ELECTRONICS

Futaba

- Standard servo—S3003, \$11
- 3PM radio—FUTK15, \$120

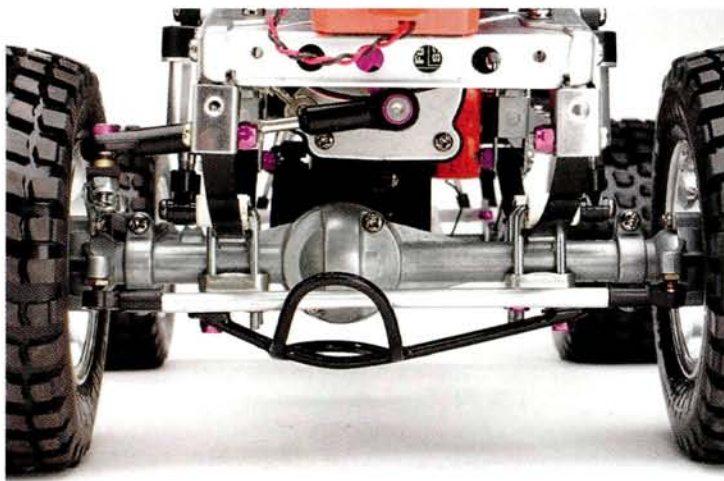
Team Novak

- Super Sport brushless system—3005, \$215
- XXtra receiver—2675, \$90

Total \$1,092

AXLE RECONDITIONING

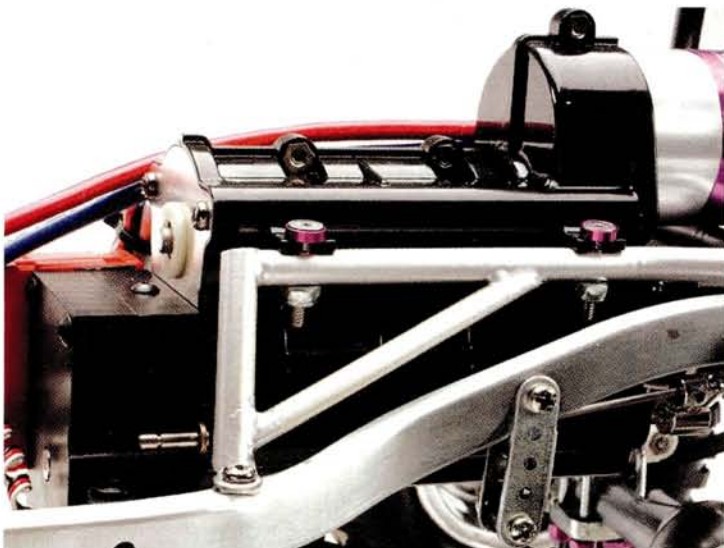
I ripped apart the front and rear axles to give the truck a little face lift. I ditched the worn bronze bushings and installed a complete set of Tamiya ball bearings. I added a little style to the front axle by installing a good-looking front axle guard from RC4WD.



Thanks to a set of Tamiya ball bearings, the Bruiser's axles are much smoother. The tubular axle guard is from RC4WD.

3-SPEED TRANNY

The Bruiser comes with a "3-speed" tranny, but it only has two speeds. You can shift the tranny using a 3-channel radio, and it shifts from 2WD to 4WD high and 4WD low. I used a transfer case from RC4WD that you can bolt to a stock, Tamiya tractor-truck transmission, it's a true 3-speed unit. The tranny is shifted like the stock Bruiser unit using a servo and 3-channel radio. The transfer case converts it from 2WD to 4WD. I made the tranny run more smoothly by replacing the bushings with a set of Tamiya bearings. To secure the case in the chassis, I made a tranny mount out of brass tubing and strips that were soldered together. It has plenty of strength to support the transmission, and looks hot. I gave the mount a coat of silver paint to match the chassis.



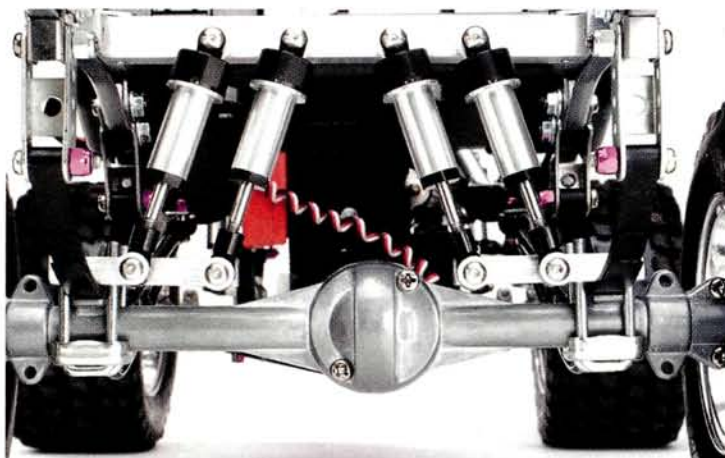
With a Tamiya tractor-truck transmission, my Bruiser now has a true 3-speed transmission. The transmission mount is a custom piece I made out of brass tubing.



Just as I would a real truck, I lifted my Bruiser with new springs. I also installed RC4WD's trick radius bars.

LIFT KIT

The guys over at RC4WD have a sweet lift kit for Bruisers and Mountaineers that I decided to pick up, too. The package's four springs have larger arches than those of the stock springs. They give the truck that custom, high-riding stance. While I had the suspension apart, I replaced the stock stamped radius bar with a new one from RC4WD. It's hand-fabricated and looks more like the ones used on real trucks.



These F201 shocks look great on my rig. Four shocks damp the rear axle, thanks to the dual shock kit from RC4WD.

MORE SHOCKS

Since I was tweaking my truck's suspension, I added a few more shocks. RC4WD offers a rear dual shock-mounting kit, and it accepts standard fluid-filled sedan shocks. The rear mount is a piece of machined aluminum billet that replaces one of the rear cross members. I used a set of Tamiya F201 optional aluminum shocks and dampers on all the corners of the track because they have a more realistic look than standard sedan shocks. And I just couldn't use the stock shocks on a modified truck! I left the springs off because the truck already has leaf springs to support the chassis.

FIND IT

>>> Go to page 244 for manufacturers' contact information

BEHIND THE WHEEL

After the photos were taken, it was time to set up the ESC and play with my toy, but my smile of anticipation quickly faded as I watched the tires spin backwards. I did a little research and discovered that the transmission was turning the wrong way with respect to the input shaft of the rear axle. That meant that I had to reverse the rotation of the motor, but the only way to reverse the rotation of a brushless motor is to set it up so that when you pull forward trigger the ESC goes into reverse. The truck won't be as fast because reverse rpm is lower, and extended reverse operation will overheat the motor.

I'm determined to use a brushless motor, which leaves me two options: construct a device that reverses the rotation of the transmission, or spin the transmission 180 degrees in the chassis. To get rolling with much less wrenching and fabrication (but without brushless power), I opted for a standard speed control and brushed motor with a reverse-rotation setup. I installed a Trinity Speed Gems Pro Amber motor and a Novak Super Rooster speed control with the motor timing set at zero degrees for reverse rotation. I went out for another spin.

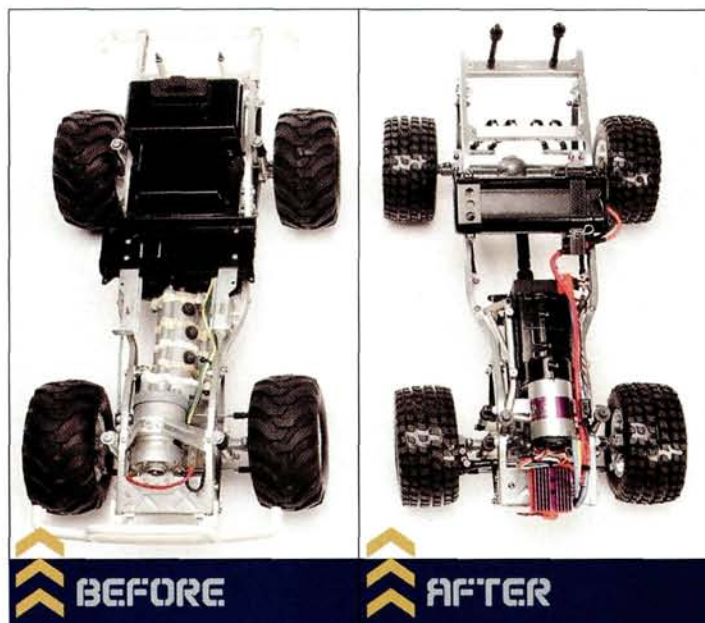
The motor puts the power down well, and the drivetrain is supersmooth. Because of the high gearing, it took no time to reach top speed in first gear. The slightest jab of the throttle broke the tires loose. In second gear, the truck is a little more controllable off the line, but the handling gets a little sketchy at higher speeds. The suspension is very stiff, and the truck isn't very wide, so it isn't exactly stable. I almost didn't want to shift this thing into third. I couldn't resist, though, and as expected, it was a bit of a handful. How much of a handful? Let's just say that its sweet Jeep body isn't so shiny these days. Time for a new one!



The stock plastic electronics box had to go; I took a little time to rearrange the chassis to show off more of its realism. This battery mount is from a Tamiya tractor-truck kit.

TIME TO REARRANGE THE ELECTRONICS

The only thing that I don't like about the Bruiser is the big, bulky box that protects its battery and electronics. I left it off so that I could see more of the chassis, and that meant I had to come up with a way to mount all that gear. I had a battery mount left over from Tamiya tractor truck, and it was perfect for my project. I simply bolted it to the chassis rails; the ESC is held in place with double-sided tape. I mounted the receiver and shifter servo on the transfer case.



TIME FOR NEW SHOES

The stock tires on the Bruiser don't look very realistic, and they're hard as rocks. I installed a set of Pro-Line Dirt Works tires instead. They look great and fit the stock rims well.

Don't bother reaching for the CA; the Bruiser's clamping rims hold the Dirt Works tires tightly without glue.



BRUSHLESS POWER

Yeah, you heard me. Brushless power! The new transmission in my truck won't accept the stock 750 motor that comes with the Bruiser, so I had to find a 440 or 550 motor to power it. Novak's Super Sport setup seemed like the perfect match—until I realized I needed a reverse-rotation motor! See "Behind the Wheel" for the details of my humiliation ... ■

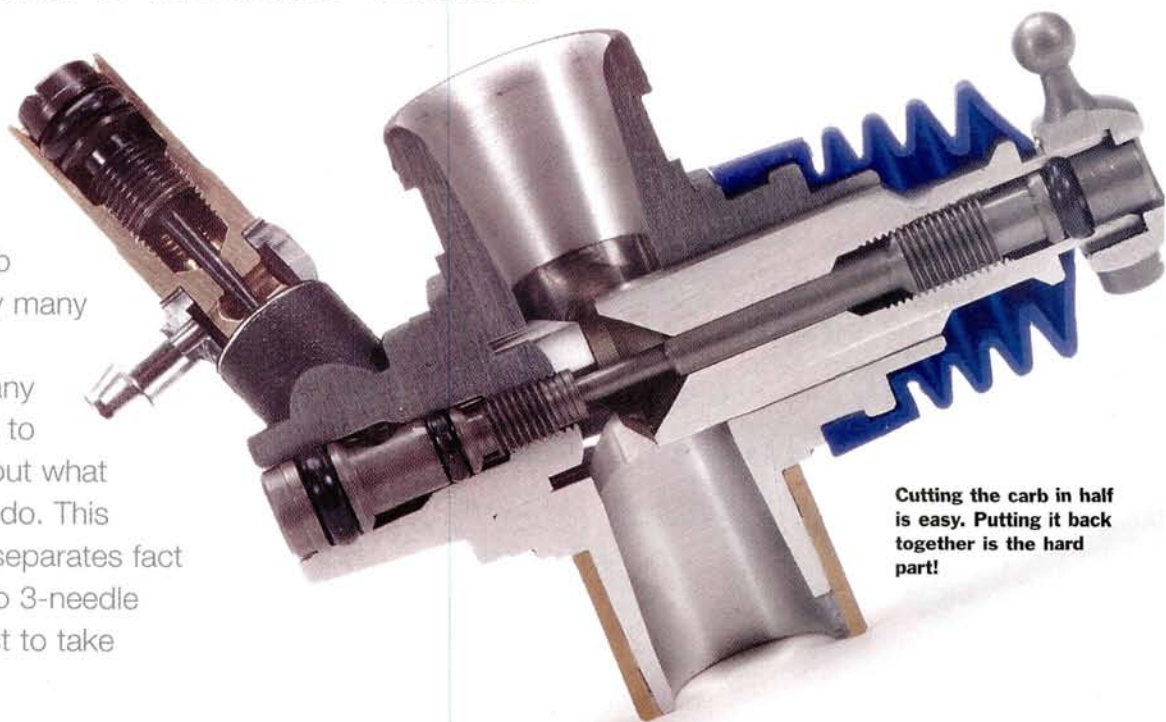
I'm not giving up on brushless power for the Bruiser yet!



Fact & fiction: 3-needle carbs

3-NEEDLE CARBS

have inspired a lot of debate and misinformation. When they were introduced, the added versatility of this new carb design was embraced by many racers, but as a result of some misinformation, many have been incorrectly led to believe certain things about what 3-needles can and can't do. This month's "Piston Power" separates fact from fiction as it relates to 3-needle carburetors and how best to take advantage of them.

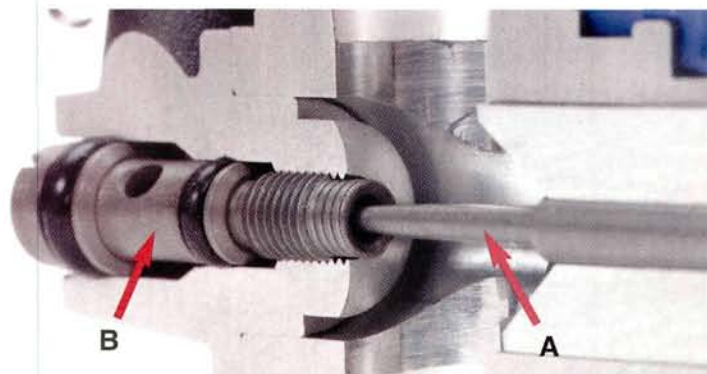


Cutting the carb in half is easy. Putting it back together is the hard part!

ANATOMY OF A 3-NEEDLE CARB

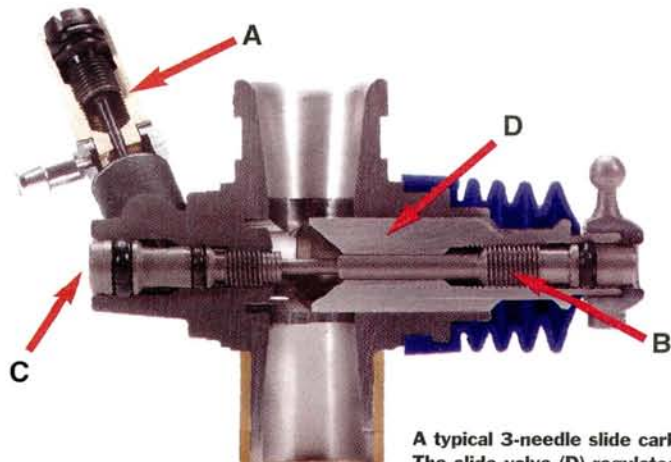
Three-needle carbs are almost exclusively slide carbs. It isn't that there aren't any rotary carbs that have a 3-needle configuration, but racers typically buy slightly more expensive carbs, and they tend to be slide carbs.

A common misperception of 3-needle carbs is that they actually have three needles. They don't; they have only two. Conventional main and low-speed needles are supported by a third adjustment that's become popularly known as the "third needle," but it isn't a needle in a conventional sense; it's a "mixture-control valve" (as it's called by O.S. Engines) that is merely an extension of the main needle assembly. This is the part of the carb that transports the fuel from the main needle assembly to the venturi. The low-speed needle partially plugs the opening of the mixture-control valve to regulate the amount of fuel that enters when the carburetor is barely open.



Fuel flow is regulated at low speeds when the low-speed needle (A) partially plugs the mixture control valve (B). The mixture control valve in most 2-needle carbs are not adjustable like the one shown here.

So, the mixture-control valve is actually the counterpart of the low-speed needle. In older carburetors, this assembly was press-fit into the carb housing and was not replaceable. Novarossi was possibly the first to use a screw-in mixture-control valve; this feature was initially included to make repair and maintenance of the carb easier. The ability to unscrew the mixture-control valve for cleaning or replacement eliminates the need to replace the carburetor if the orifice of a fixed valve is plugged, damaged, or worn. The idea of using this as a midrange fuel-mixture adjustment is primarily a gimmick, but it does subtly affect fuel delivery nonetheless, and it offers additional tuning options. The degree to which it affects the mixture and engine performance is the subject of frequent debate, so we're going to do our best to clear that up.

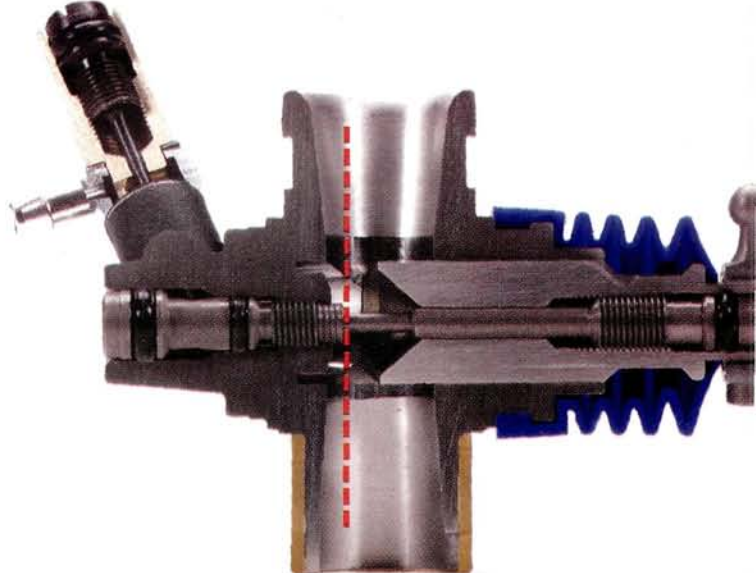


A typical 3-needle slide carb includes: a main needle (A), a low-speed needle (B) and a mixture-control valve (C). The slide valve (D) regulates airflow.

HOW TO ADJUST THE THIRD "NEEDLE"

When adjusting the main or low-speed needle, a simple twist one way or the other gets the job done, but adjusting the midrange is a two-part process. The degree to which the mixture-control valve enters the venturi influences midrange throttle response. As the carburetor opens, the slide valve reaches a point at which it opens far enough to expose the outlet of the mixture-control valve to direct airflow, and that produces a subtle increase in the amount of fuel that flows into the engine. If the mixture-control valve is turned counterclockwise, it won't protrude as much into the venturi, so the valve is exposed to direct airflow at a lower throttle position as the slide valve opens. Conversely, threading the mixture-control valve into the carb extends it farther into the venturi, so the throttle must be opened further for the valve to be exposed to direct airflow and initiate the slight boost in fuel delivery at higher engine rpm. This, however, is only the first of two steps to complete the midrange adjustment.

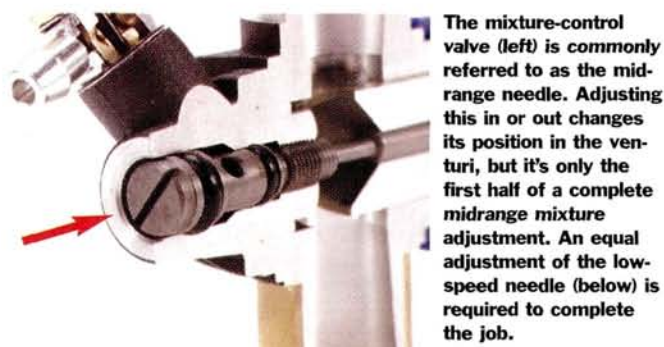
The second step involves adjusting the low-speed needle. Yes, it sounds weird because we're still talking about



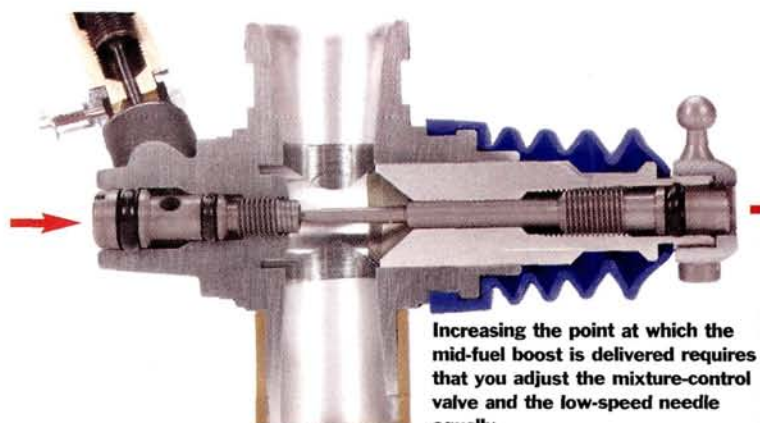
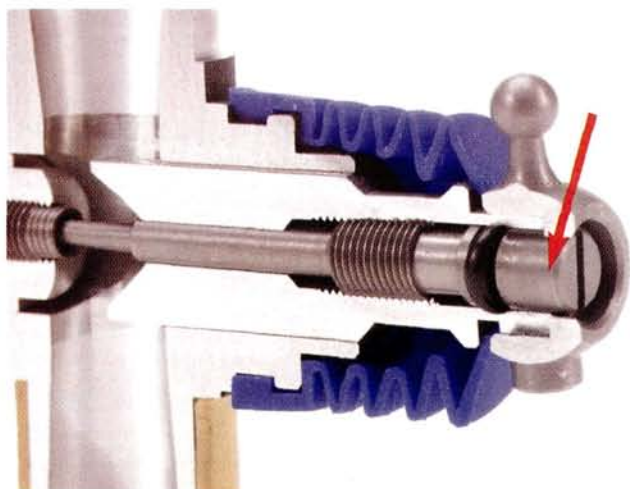
Adjusting the midrange mixture setting changes the position at which the mixture-control valve is exposed to direct airflow as the slide valve opens. Once the slide opens that far, there's a slight boost in fuel delivery.

midrange adjustment, but you must simultaneously adjust the mixture-control valve and the low-speed needle for a successful midrange fuel-mixture adjustment. Any adjustment of the mixture-control valve without a corresponding adjustment of the low-speed needle will just affect the low-speed mixture. For example, if you crank the mixture-control valve 2 turns counterclockwise, you have to turn the low-speed needle 2 turns clockwise. If you turn the valve clockwise once, you must turn the low-speed needle counterclockwise once. Basically, any adjustment that's made to the mixture-control valve must be reversed on the low-speed needle. That way, the relative positions of these two components remain the same.

You also have to make larger adjustments than you do with the main and low-speed needle adjustments. You might only move the aforementioned needles $\frac{1}{8}$ of a turn at a time, but the midrange should be adjusted in $\frac{1}{2}$ to full-turn increments. A full turn may only move the mixture-control valve a $\frac{1}{2}$ millimeter, and that is a relatively small shift.



The mixture-control valve (left) is commonly referred to as the midrange needle. Adjusting this in or out changes its position in the venturi, but it's only the first half of a complete midrange mixture adjustment. An equal adjustment of the low-speed needle (below) is required to complete the job.



Increasing the point at which the mid-fuel boost is delivered requires that you adjust the mixture-control valve and the low-speed needle equally.



Q On my chassis, I noticed a stripe of grease splattered in line with the front bearing of my engine. It's a new engine, and I'm worried that the bearing is blown. It looks as if the bearing is already leaking, but I haven't even burned through one gallon of fuel yet. Is there any way to check the bearing, and if it is worn, doesn't it seem a little short-lived for such a new engine?

Lonny B.

A It's pretty common for a new engine to leave that characteristic stripe of grease or oil on the chassis. It's a common misconception that the front crank bearing only leaks when it's damaged or worn out. The fact is, they leak all the time—especially the metal-shielded bearings. To prevent this, many engine manufacturers have switched to rubber-sealed front bearings to avoid the appearance of a leaking bearing—not because it's a sign of a bad bearing but, in part, because of the perception that it's a bad thing. That stripe of oil on the chassis tells you that the front bearing is being properly lubricated, and that some of the oil is making its way past the bearing. Rubber-sealed bearings tend to leak much less, but it happens with all types of bearings and isn't a cause for concern nor is it a reflection of the bearing's condition.

WHEN YOU SHOULD ADJUST THE MIDRANGE

Midrange fuel-mixture adjustments produce very subtle results. The fuel-mixture setting isn't really changed, just the point at which a little extra fuel is delivered to the engine. Typically, it's best to make such an adjustment when your engine's midrange performance is suffering. For example, if there's a flat spot just off idle, it may be best to cheat the mixture-control valve towards the opening side of the carb. Likewise, when the engine is loading up in the midrange and having trouble making a strong transition to the upper end of the rpm range, it might be better to move the mixture-control valve farther into the venturi to keep the midrange a little lean while the engine is winding up. Just be sure that you aren't using the midrange adjustment to compensate for a poor low- or high-speed mixture setting. The low-speed and main needle must be adjusted properly before you turn your attention to the midrange setting. The midrange fuel mixture should be the last adjustment you make because it's the most subtle and can't compensate for poor settings elsewhere.

ADJUSTING THE LOW-SPEED MIXTURE WITH THE MIXTURE-CONTROL VALVE

Before you buy into the "never touch the midrange setting" nonsense, read the following, and it will become clear why the low-speed mixture can be safely and accurately adjusted from either end of the carb. You can adjust the low-speed fuel mixture by simply adjusting the midrange mixture-control valve. It sounds confusing, but an adjustment of the mixture-control valve without a corresponding adjustment of the low-speed needle, produces the same effect as just adjusting the low-speed needle. For example, when you make a conventional adjustment to lean the fuel

mixture, you turn the low-speed needle clockwise to move it closer to the mixture-control valve and reduce the amount

In some 2-needle slide carbs, the mixture-control valve (shown here) is the only means of adjusting the low-speed mixture setting. This debunks the myth that you shouldn't touch this setting in 3-needle carbs unless you "really know what you're doing."



of fuel flowing into the engine. Turning the mixture control-valve counterclockwise does the same thing; instead of moving the needle closer to the mixture-control valve, you're moving the mixture-control valve closer to the needle. It's a little-known

fact that most O.S. 2-needle slide carbs have fixed low-speed needles, so all of the low-speed mixture adjustments are made using the mixture-control valve. It's convenient to have two ways to adjust the low-speed mixture because the conventional low-speed needle can be difficult to reach in some installations. In 1/8-scale on-road cars, the low-speed needle faces forward and can require a harsh angle on the screwdriver to reach it. Sometimes, you get an unobstructed, straight shot at the mixture-control valve from the rear of the car, and that makes it a better alternative in a pinch.

Three-needle carbs have been around for quite a number of years now, but fear of the unknown has caused some to shy away from them. The truth is, if the engine you want has a 3-needle carb, please don't give any consideration to Internet engineers who tell you that you "have to" use a certain type of carb for one application or the other. Carbs aren't that smart; they don't know where they're running or in which vehicle they've been installed. They only meter air and fuel in the exact quantities for which they're set. Don't start searching eBay for a new carb just because someone on the Internet says you should. Three-needle carbs are virtually identical to

THREE-NEEDLE MYTH-BUSTING

MYTH: If you aren't an expert, you should stay away from the mixture-control valve.

BUSTED: The mixture-control valve, often referred to as the third needle, is an effective alternative to adjusting the low-speed fuel mixture when used on its own, and when used in conjunction with the low-speed needle, it's subtle but effective for fine-tuning midrange throttle response. Internet urban legends might lead some of us to believe that if you even touch the midrange setting, you could screw up the carb forever, but that's pure fiction. By that logic, we should never make any fuel-mixture adjustments. Telling people to stay away from this mysterious setting is just easier than taking the time to explain what it does and how it works.

MYTH: 3-needle carbs are no good for off-road racing.

BUSTED: Nonsense. There's nothing that makes a 2-needle carb any better suited to off-road vehicles than a 3-needle. In fact, they are virtually identical except for the fact that the mixture-control valve can be adjusted and replaced in one and not in the other. If you were desperately searching for a reason why a 3-needle carb might be unsuitable for off-road racing, you could make the argument that the O-rings that seal the mixture-control valve to the carburetor body can wear out and become encrusted with dirt, but it would be a very thin argument.



The 2-needle carb on the left has a fixed low-speed needle; the carb on the right has an adjustable low-speed needle. The mixture-control valve (which is the "third needle" in 3-needle carbs) is used to make low-speed mixture adjustments in the carb on the left.

2-needle carbs; they just offer a wider range of adjustments and give you another adjustment option for your low-speed fuel mixture. There's also no reason to be concerned about making adjustments to a 3-needle carb. It's no more or less perilous than making any other adjustment to a carburetor. Proceed with caution, but don't worry that you've pulled the pin from the proverbial grenade when you experiment with making midrange mixture adjustments. ■

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>>> Go to page 244 for manufacturers' contact information.



Internal decal tips & tricks



Internal decals are a quick and easy way to go beyond a bland, one-color look, and when combined with a few additional techniques, they can become something really special. Here are some ways you can use internal decals to add flair to your ride, ranging from basic application to advanced techniques that will have your car envied on the street or at the track. You won't have to reveal how easy it is to get the effects.



Pro-Line and Team Orion also make excellent internal decal sheets in a variety of designs that can be applied and modified as described here.

BASIC APPLICATION

Using internal decals can be as easy as sticking them on and then spray painting a backing coat. This month, I applied excellent stickers from XXX-Main to Pro-Line shells. Follow these steps to get the best results.

- 1** Clean the body and apply the window masks.
- 2** Cut out the decal with scissors. Trim as close to the edge as you can; don't leave a "halo" of clear decal material.
- 3** Position the decal while its backing is still in place, then trace its outline on the outside of the shell for use as an alignment guide. It helps if you shine a light through the body and decal during this step.
- 4** Remove about 1 inch of backing, and then position the decal. Remove and realign it, if necessary. After you have the decal where you want it, slowly burnish down the decal as you remove the backing. Work from one end to the other to avoid air bubbles and wrinkles.





XXX-Main's XXXtreme Volts pattern (item no. R005) was used on Protoform's 200mm Caddy CTS-V shell, and the Pro-Line C6 Vette sports the Diamond Scallops design (item no. R015).



S Repeat these steps for the other decals that you plan to use, and then spray on a backing color. Be sure to spray the paint on in light coats to avoid having the paint bleed under the edge of the decal. Done!



SPECIAL TECHNIQUES



■ ADD A HALO

To help the decals melt into your paint job, you can spray a subtle halo around the graphic. Use a dark halo to create a shadow effect, or choose a brighter color to produce a glowing look. When spraying the halo, aim for the edge of the decal; you want only a feathered edge to appear around it. This can be done using spray cans or an airbrush. When using spray cans, direct the spray pattern so the faded edge of the spray will create the halo.



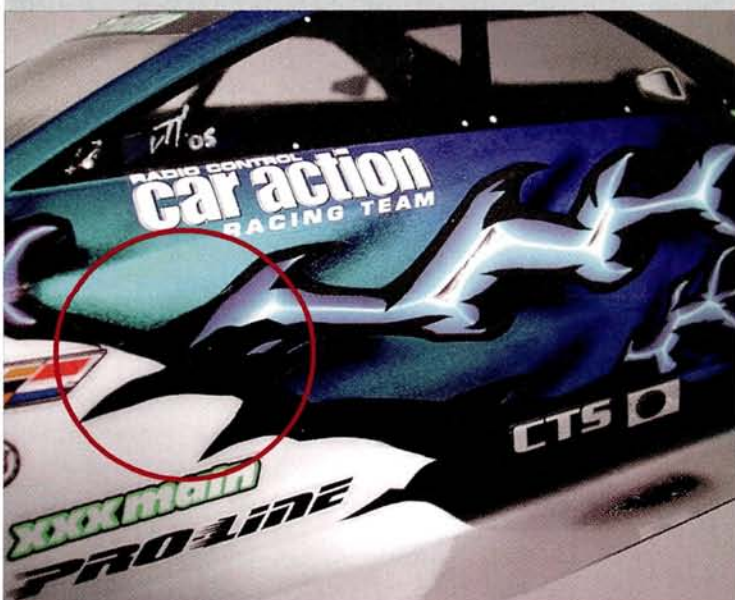
■ CUSTOM TRIMMING

There's no rule that says you have to use the entire decal! Try cutting out sections of a decal to create new designs or to custom-fit a decal to your car's body. You can even mask clear sections into the decal for lighting effects or to let different backing colors show through. If you're nervous about cutting up those new decal sheets, just photocopy them. You can try out all your mods on the photocopies before you commit scissors to the vinyl.

As an example, I integrated a set of internal stickers to match a primary background design. With a general idea in mind, I temporarily attached the stickers I wanted to use on the inside of the body and drew a design on the outside. I trimmed the decals and then applied them to the body to match the design. From this point on, masking was applied over the stickers, and I painted on the primary design using conventional masking techniques.



Here, I cut out a section of the graphic to fit in with the paint scheme that I sketched on the outside of the body.



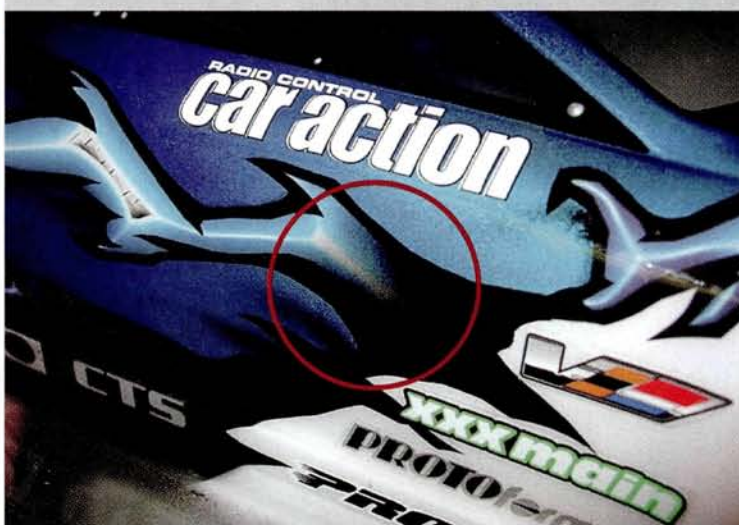
After paint is applied, the black backing color fills in nicely around the decal.

■ FADES

If you're feeling really creative, internal stickers can also be applied over partially painted and faded sections of a body. As in the method described in "Custom trimming," a sticker is carefully matched to a background design, but the custom fade technique differs in that the sticker is applied over a section that has already been painted. In this case, the design must be carefully planned to allow the proper masking and painting sequences. There are infinite possibilities. The main thing to remember is that a decal applied over a faded section won't stick very well, so you have to be especially careful to make sure that the stickers' edges are thoroughly burnished so that no bleeding will occur.



When using the fade technique, paint is applied first; then the graphic is layered over it. As the black paint gets gradually thinner, the decal behind it shows through more.



When completed, the fade makes crafting very complex graphic designs surprisingly easy.

Internal stickers are a great way a way to save time, and they allow you to achieve a sharp, detailed look without a lot of demanding painting and masking. To take your vehicle's body to the next level, try adding a few of the custom touches using the advanced techniques described here. Plan your design and clean the body before you apply any paint or decals, and you'll be surprised how little work it takes to have it stand out from the crowd. ■

● FIND IT

Go to page 244 for manufacturers' contact information.

CARISMA Williams F1

I HAVE ALWAYS BEEN A FORMULA 1 FAN, so I was excited when I received the latest offering in Carisma's F1 lineup—the Williams F1. (A Ferrari F2002 was Carisma's first 1/14-scale F1 car.) This BMW replica is available with either Ralph Schumacher or Juan Pablo Montoya as the driver, and Carisma gives you everything you need to get it up and running; it's a complete, ready-to-run kit. Add to that a street price of about \$100, and you have the makings of a very impressive product. Although it wasn't designed as a race car, which F1 aficionado could pass up a 1/14-scale grid of these babies? I know I can't.

Open the box, and you'll find a completely assembled and decaled car—ready to go. Just 13 inches long, the car's details are worthy of a static model. The polycarbonate body has all of the strakes, diffusers and winglets of the real car, and every sticker is correct, right down to the driver figures' helmets, which are exact copies of those worn by the car's real drivers (they even chromed Montoya's helmet!). The wings could pass for the real things, too. Molded in tough plastic, the rear wing features three elements like those on the full-size Williams race cars, and the front replicates the original high nose to a tee; I hope the little Carisma car's front wing will be less fragile in a crash than its big brother's. With such an awesome-looking body, Carisma couldn't disappoint on the rolling stock—no worries: the wheels imitate the original OZ Racing multi-spokes, and the tires are ringers for the grooved Michelins you find mounted on them. Digging a little deeper into the box, you'll also find a 6-cell 600mAh Ni-Cd battery pack, a 2-hour wall charger and a transmitter. Carisma even includes the 8 AA transmitter batteries; you need nothing to complete the package!

After emptying the box, I put the battery on charge so I'd be able to get a closer look at the compact chassis and electronics. The chassis is molded in black plastic and has countersunk screws that allow the car to sit nice and low to the ground. Suspension is fairly simple: coil springs up front and a pan-car-style plastic T-plate with a friction coil-over shock in the rear; there isn't any real damping, but the tall-sidewall tires should do a good job of preventing the car from jumping over every little crack. Also at the back is a solid axle with a

bevel-gear differential

that receives power from a 300 motor.

Though it isn't as powerful as a 540 motor, the smaller 300, or "big-block" to the 1/18 guys out there, should provide a good blend of pep and run time for the diminutive F1. Since space is at a premium, Carisma includes a reversing ESC with a built-in 27MHz receiver unit; it's small and does a good job of fitting under the chassis-hugging Williams body. Steering chores are handled by a standard-size servo (it's also an integral part of the ESC/receiver unit). Controlling the whole ball of wax is Carisma's own transmitter. The pistol-style unit keeps things simple by having only steering and throttle trim. It's a basic radio without a wide range of adjustments, but considering the kit's low price, the comfortable, reliable transmitter is more than I expected.

TESTING

With my battery charged, I packed up the Carisma and headed out. As it is with any small-scale car, ground clearance is at a minimum, so run it on smooth pavement. With that in mind, I headed over to a new basketball court, and

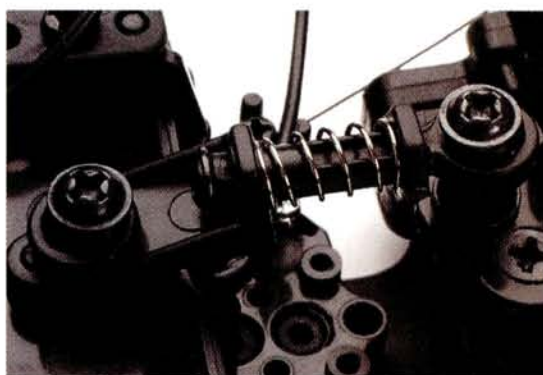




Carisma equips the 27MHz receiver with replaceable crystals and integrates it into the ESC to save space. The servo (also an integral part of the ESC) is of standard size and plenty strong.



Up front, simple springs are sandwiched between realistic-looking upper and lower suspension arms.



In the back, the plastic T-plate has plenty of flex, and that helps to keep the rear tires planted. The friction shock doesn't provide much damping, but it does help to support the chassis and prevent it from bottoming out.

the battery with the Novak Ionic I had taken along. Other than a few scrapes on the chassis's underside and a nicely tattooed front wing, nothing was bent or broken. Even after a few runs, the tires showed very little wear—good stuff.

THE VERDICT

Carisma has done a great job on the Williams F1 with its scale detail, stout construction and praiseworthy performance. This manufacturer manages to pack hobby-quality stuff into a package that costs about \$100. It's a definite winner for full-size F1 fans. And although it looks good enough to display, I doubt that it will spend much time on the shelf. As a matter of fact, mine is heading back to my workbench for an intensive upgrade program; stay tuned for some serious home-brew hop-ups. —*Elvis Machado* ■

CARISMA; distributed by Horizon Hobby Inc. (800) 338-4639; horizonhobby.com.

after the customary trim-setting, slow-speed run, I gunned the trigger and was pleasantly surprised by the F1 car's zip. It didn't exactly leave two black stripes on the court, but it did spin the tires for a couple of feet before it took off; top speed was about 15mph—not bad for a car of this size. Acceleration was very smooth, and reverse was able to get the car out of any trouble I got it into. Handling was also impressive; the steering is very quick, and overall grip is pretty balanced. The tires only lost traction in the rear with a handful of throttle coming out of tight turns, but even then it was controllable. Any fears I may have had regarding the car's durability were quickly put to rest when I nailed one of the basketball poles at full speed and the little Carisma just kept on rolling—so much for “fragile” F1 cars! After clocking about 15 minutes of run time, the car started to slow, so I took it in for an assessment and to recharge



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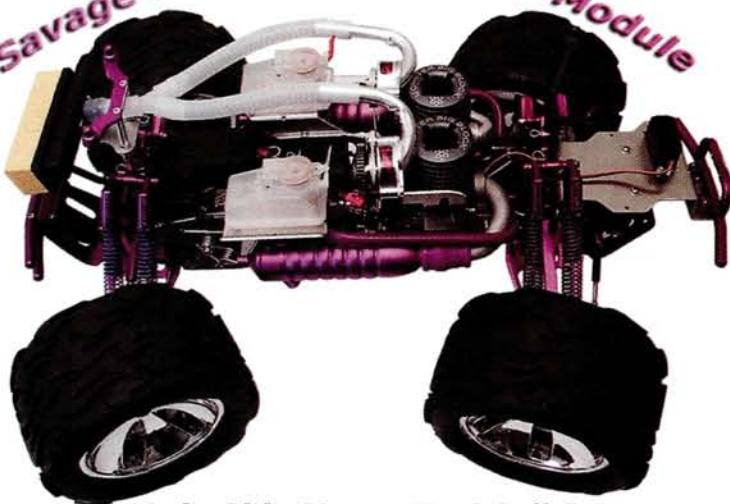
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OUR FAVORITE TOOLS



DOOGIE: TOOLZ WHEEL NUT WRENCH

This tool is my all-time favorite for reasons other than functionality. For starters, it was given to me by pro driver Richard Saxton, so there's the added cool factor of having received it from one of the top pros. From an aesthetic point of view, its clean lines and chiseled billet finish remind me of a tool that you would only see being used on an F1 car or some other high-end factory machine.



JOEL: X-ACTO KNIFE

Not only is it the best tool for cutting out a body and making perfect wheel wells, but it can also be used for trimming plastic A-arms for more clearance, dabbing CA onto small parts and making starter holes before you drill. I also use it to threaten people who think they're faster than me ...



MATT: DREMEL

This thing's good for everything but pounding nails. If I've used my Dremel once, I've used it a million times. From slotting stripped screw heads for removal to tweaking the ports on a nitro engine, this tool really does it all. Except pound nails.



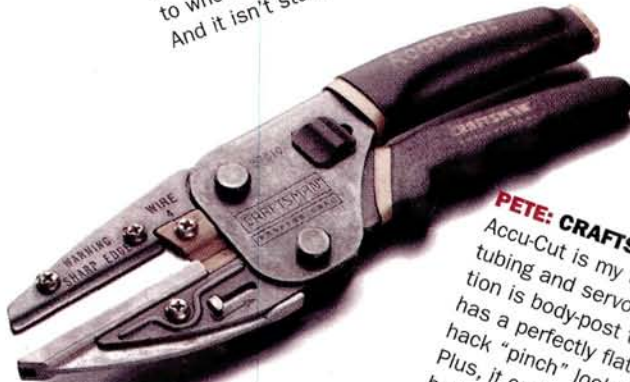
KEVIN: OFNA TIRE GLUER

Thank you, OFNA! Just stick a tire in the machine, close the top, and press. The tire spins and pulls the bead away from the rim while you apply glue. When you lift the lid, the tire stops spinning, the bead is done, to where it belongs, and the job is done. And it isn't stuck to my hand.



PETE: CRAFTSMAN ACCU-CUT

Accu-Cut is my tool of choice for snipping fuel tubing and servo tape, but my favorite application is body-post trimming. Snip, and the post has a perfectly flat, factory-looking cut—not the hack "pinch" look you get from side cutters. Plus, it can cut through a garden hose like it was butter. Not that I do that very often, but it's cool.



WHAT'S YOUR FAVORITE TOOL?

Tell us in 100 words (give or take), and you'll win a trick Tamiya TRF tool kit. Nice!

Entries must be received by April 30, 2005. One entry per person. Email your entry to backlot@airage.com with "FAVORITE TOOL" in the subject box, or snail-mail entries to: RC Car Action, Attn: Favorite Tool, 100 East Ridge, Ridgefield, CT 06877.

